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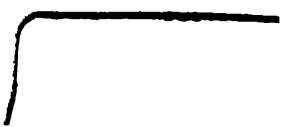
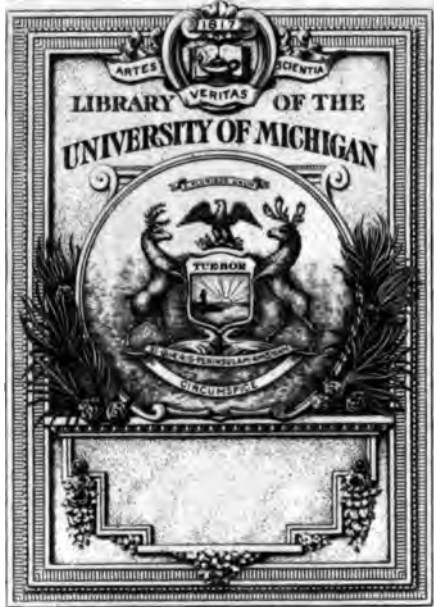
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July, 1498; whereas Columbus did not reach the mainland of South America, near the mouth of the Orinoco River, until August 1st of the same year.¹

Following in the wake of the Cortereals, Jacques Cartier and other explorers, these Northern shores became the resort of Basque, Breton and English fishermen, who here reaped the rich harvest of the sea and left behind memorials of their presence, in the shape of scattered ruins and a string of geographical names which possess an old-world character which is unmistakable.

In later times, the Labrador coast has continued to be the rendezvous of a large fleet of fishermen, whose numbers are recruited, in the main, from the neighboring colony of Newfoundland; these hardy seamen possess an intimate knowledge of the coast; but their interests being wholly connected with the sea, the interior has remained a mystery to them, while to their agency, more than any other, must be ascribed the reputation which has gone abroad of the Arctic climate and desolate interior of Labrador. It is undoubtedly true that the 760 miles of rocky seaboard stretching from the Strait of Belle Isle to Cape Chudleigh well merits the reputation given it by all travellers, as a savage and sterile coast unique in its wild desolation. The climate, likewise, is most severe as a result of the ice-laden

¹ For a critical discussion of early voyages to Labrador, as well as a comprehensive account of the geography, geology and inhabitants of the coast, *vide*: Prof. A. H. Packard's recent work, *The Labrador Coast*. New York, 1891.

Referring to the voyages of the Cabots, the author quotes (p. 36) the German author Johann Georg Kohl: "'Although on their return from their first voyage of 1497 the Cabots believed that the land they had discovered was some part of Asia, to them must be given the credit of beholding the American continent before Columbus; while, with little or no doubt, Sebastian Cabot beheld in July, 1498, the mainland of Labrador, for, says Hakluyt, 'Columbus first saw the firme lande, August 1, 1498.''"

Arctic current which passes along the coast. This current, with the north-east polar winds, produces a mean annual temperature, which at many places is below the freezing point. But the interior presents conditions much more attractive, and having advanced inland a short distance from the coast, a marked improvement is apparent. The forbidding character of the coast, however, has given a false impression of the whole country, and in this we must find explanation of the fact that Labrador has so rarely been visited by travellers, while many less accessible parts of the earth have gradually yielded up their secrets.

From the time of the early navigators to the present, various maps embracing the Labrador peninsula have been published. An examination of these reveals most strikingly the absence of accurate information, more especially in relation to the interior. Of the great rivers—the natural highways to the interior—the ignorance of geographers has been commensurate with their information relating to other physical features of the country, and none of the maps portray the fluvial systems and great inland lakes with any degree of precision. The existence of a great table-land in the interior has long been known. This elevated plateau extends to the coast in the north-eastern part of the peninsula, and here it is said to attain a great height, rising precipitously from the sea and supporting mountains, some of which reach an altitude of six thousand feet.² At a point north of Hamilton Inlet the line of this platform seems to recede from the coast trending in a south-easterly direction towards the Gulf of St. Lawrence. The interior portion of the plateau probably attains its greatest elevation at a point somewhat south of

² Dr. Robert Bell. *Report Geological and Natural History Survey of Canada. 1885. Vol. I, p. 8, D.D.*

the geographical centre of this elevated region. Here the great rivers of the peninsula have their source; and here the central water-shed of the country is located where, within a comparatively limited area, elevated, lacustrine basins discharge their waters north into Ungava Bay, east into the Atlantic Ocean, south into the Gulf of St. Lawrence and west into Hudson Bay.³

The most important stream which flows towards the Atlantic seaboard is the Grand, or Hamilton River, which rises in the lakes on this upland and flows in a general south-easterly direction into Hamilton Inlet—the great arm of the sea which, under various names, penetrates the interior a distance of one hundred and fifty miles. No scientific explorer has advanced far into the country, and the imperfect knowledge of the interior rests almost entirely on the vague reports of Indians, a few missionaries, and information furnished by agents of the Hudson's Bay Company. In fact, of the interior of this vast territory, estimated to contain two hundred and eighty-nine thousand square miles,⁴ but little is known; notwithstanding it is much nearer England and the United States than many portions of the globe which are frequently visited by travellers and scientists.

A variety of considerations have combined to bring about this condition of affairs: the reputation for sterility which has attached itself to the country, the brevity of the summer season, the difficulty of navigating the rivers,

³ While at North-west River Post, in September, 1891, I was informed by two aged *voyageurs* of the Hudson's Bay Company, who had made frequent journeys to the "Height of Land," that this water-shed is found not far from the site of Fort Nascopie, an outpost long since abandoned by the Company.

⁴ Dr. G. M. Dawson. Paper read before the Field Naturalists' Club of Ottawa, 1890.

the absence of any commercial incentive and the indifference or inability of the governments concerned, all have united to bring about the present condition of unenlightenment. Labrador, consequently, has presented a comparatively new field to the explorer. It will be of interest to note briefly such geographical researches as have been undertaken from time to time.

As is well known, missions of the Moravian Church have been established on the coast for over a hundred years, the earliest one, Nain, dating from 1770. In 1811, the brethren of one of the northern establishments explored the coast of Ungava Bay, which had previously been entered by Weymouth as far back as 1602. The missionaries subsequently published a pamphlet, describing the Ungava district as a comparatively fertile area and as offering a suitable field for missionary effort among the heathen Eskimos of the north coast. According to Mr. W. H. A. Davies, who published a description of the Ungava neighborhood,⁵ the appearance of this pamphlet first called the attention of the Hudson's Bay Company to this part of Labrador, with the result that Fort Chimo was built on the Koksoak River, twenty-seven miles distant from Ungava Bay, in 1827. Referring to the attempts of the Company to investigate the interior, Davies says: ". . . it was not until 1834 that any efforts were made to explore the interior to the southward and eastward. In that year, a clerk of the Company left Fort Chimo on the sixth of April, to explore the country to Mingan, but when on the height of land, his guide refused to conduct him there, and brought him to Esquimaux Bay, where he arrived on the twenty-second of June, being the first European who had

⁵ W. H. A. Davies. *Notes on Ungava Bay and its Vicinity. Transactions Literary and Historical Society of Quebec. 1854.*

traversed the interior in that direction." Davies obtained his data from Mr. John M'Lean, who was the company's agent at Fort Chimo from 1837 to 1842. In the year 1839, this officer, while seeking to find a more practical route than the one heretofore used between Ungava Bay and Esquimaux Bay, traversed the northern part of the peninsula in canoes, travelling from north to south. He reached the most inland outpost of the Company, Fort Nascopie, which had recently been established on Lake Petchikapou. Finding a large stream, which he subsequently identified as the Grand River, issuing from the lake, he boldly set out to navigate it, hoping it would lead in the desired direction. While moving down this river, where no white man had been before, M'Lean discovered the Grand Falls of Labrador, which proved a barrier to his further descent of the river. Being thus frustrated in his design to establish an inland route to North-west River Post, and finding the river for many miles below the Falls inaccessible, he abandoned his project, and says: "With heavy hearts and weary limbs we retraced our steps." M'Lean, however, subsequently learned from the Indians of a chain of lakes by which the Falls and Cañon could be circumvented, and this route was used by the Hudson's Bay Company for many years in sending supplies from the head of Hamilton Inlet (Esquimaux Bay) to Fort Nascopie, the inland post before referred to.

After resigning from the Company and returning to civilization, M'Lean published a graphic account of his adventures in Labrador, and his brief description of the Falls possesses great interest, as that of the first white man who ever gazed on this remote cataract.⁶ The tradi-

⁶ John M'Lean. *Notes of a Twenty-five Years' Service in the Hudson's Bay Territory.* London, 1849.

tions of the Hudson's Bay Company affirm that twenty years after M'Lean's visit, the Grand Falls were again visited by an officer of the company, Joseph McPherson, who while on his way to Fort Nascopie, made a detour from the established route for the purpose of examining the Falls. He was guided to the spot by an Iroquois Indian named Louis-over-the-fire, who lived until November, 1892, an aged pensioner of the Company, at North-west River Post. These are the only white men who, previous to the summer of 1891, are known to have seen the Grand Falls.⁷ Neither M'Lean nor McPherson measured the height of the Falls, and, in fact, it does not appear that the latter ever gave any account of his visit to this region. To continue the brief record of Labrador exploration, mention should be made of the journey of Prof. H. Y. Hind, who thirty-two years ago started from the Seven Islands, on the St. Lawrence coast, and ascended the Moisie River, a distance of one hundred and twenty miles. Strictly speaking, the territory drained by this affluent of the St. Lawrence is not in Labrador proper, but is embraced within the eastern borders of the province of Quebec.

In the account of his explorations, Prof. Hind gives the height of the interior plateau of Labrador as something over two thousand two hundred feet, and this

⁷ Subsequent to my departure for Labrador, I learned of another American expedition, under the auspices of Bowdoin College, which proposed to visit the Labrador coast during the summer of 1891. The plans of this expedition included the despatching up the Grand River of a subsidiary party of four students. The inland party entered the mouth of the river on July 27th, and two members of it, Messrs. Austin Cary and D. M. Cole, succeeded in reaching the Falls on August 13, 1891. Mr. Cary published an account of his journey in *Bulletin American Geographical Society*, Vol. XXIV, p. 1.

idea has been accepted by most writers on the subject.⁸ Now ensued a long period, during which no traveller or trader disturbed the loneliness of this remote wilderness. Fort Nascopie, the interior post of the Hudson's Bay Company, was abandoned some twenty-nine years ago, and the Indian trail which led to it and passed within fifty miles of the Falls was disused in the interval. No one endeavored to ascend the Grand River, and the dim tradition of the Falls was almost forgotten.

At length, in 1887, an English traveller, Mr. R. F. Holme, of Oxford University, journeyed to Labrador and started up the Grand River, having the Falls as the objective point of his expedition. He relied on Prof. Hind's statement that the cataract was a hundred miles from the mouth of the river, and consequently found himself insufficiently equipped for what proved to be a much longer journey. With a boat and two men he pluckily surmounted the difficulties of river navigation, and reached a point about a hundred and forty miles from the mouth of the river, when he was obliged to turn back by the failure of his provisions. Mr. Holme read an account of his journey before the Royal Geographical Society, and I am indebted to this narrative for much valuable information regarding the river and the conditions prevailing in the country.⁹

I am informed that another attempt to reach the Falls was made in the summer of 1890, by Mr. J. G. Alwyn Creighton, of Ottawa, Canada, who sailed down the Gulf of St. Lawrence as far as the mouth of the St. Augustine River, where he secured canoes and Indian guides and

⁸ H. Y. Hind. *The Labrador Peninsula. Vol. II, p. 134. London, 1863.*

⁹ *Proceedings Royal Geographical Society. April, 1888.*

ascended the river a considerable distance, hoping to reach the waters of the Grand River by an overland route much used by the natives. Unfortunately, he encountered one of those great forest fires which seem to periodically desolate great areas in Labrador. After losing some time in attempting, without success, to overcome this obstacle, he was compelled by the want of provisions to relinquish his project and return home.

My attention was first drawn to the Grand Falls of Labrador in the early spring of 1891, by reading a fugitive newspaper article on the subject. The writer referred to the stories current among the Indians and *voyageurs*, which tended to prove the existence of a great waterfall in the interior. The author seemed inclined to accept the legendary accounts of the cataract, which ascribed to it the stupendous height of one thousand five hundred feet. There was something in the very idea of this distant cataract—thundering on for ages in that far-off land—which appealed forcibly to one's imagination and seemed to mark the spot as a worthy goal for some traveller willing to penetrate the interior and verify the reports long current as to the height and location of this natural wonder. After further investigation, the conviction was strengthened that a visit to the Grand Falls presented no insurmountable obstacles. Confident, therefore, that such a trip would yield interesting geographical results and exciting sport with rod and gun, I determined to essay the voyage.

I was fortunate in obtaining in Prof. C. A. Kenaston, of Washington, D. C., an associate who entered with enthusiasm into my plans. Preparations for the journey were made in the early part of June, 1891. The various articles of equipment were gotten together with some

care, and included, among other things, a Rushton canoe sixteen feet in length.

We sailed from New York June 23d, on the steamship *Pertia*, and arrived at St. Johns, Newfoundland, on the twenty-ninth of the same month. After an unexpected and vexatious delay here of over two weeks, we sailed from St. Johns on July 15th, on the small steamship *Curlew*, the boat engaged by the Newfoundland Government to carry the mails on the Labrador coast during the summer. After calling at several ports on the north-eastern coast of Newfoundland, our stanch little craft turned north, and, steaming through the dense fogs of the Strait of Belle Isle, we soon caught our first glimpse of the Labrador coast. The four days' sail along this coast was the most enjoyable part of the voyage. Space will not permit me to make any extended reference to the novelty and grandeur of the scenery which formed so impressive an introduction to this rugged north-land which was to be the scene of our wanderings. The shores presented a bold, irregular line of hills, wild and desolate in their aspect, and for the most part entirely destitute of verdure; their precipitous bases presenting bold headlands to the waves of the Atlantic. Icebergs soon became frequent. In one day I counted twenty-six. Our fellow-passengers, most of whom were engaged in the fisheries, viewed these Polar visitors with the indifference born of familiarity; but for my part, I regarded these majestic, luminous white masses with the keenest interest.

On July 23d, we arrived at Rigolet, in Hamilton Inlet. This is the chief station of the Hudson's Bay Company in Labrador, and at the time of our visit, Chief Factor P. W. Bell, a veteran officer of the Company, was in charge of the post. We were provided with letters of introduction

and were most hospitably received. A small schooner being placed at our disposal, the following day we continued our journey into the interior, sailing westward through the great interior basin known as Melville, or Grosswater Bay. The Mealy Mountains stretch along the southern shore almost the entire length of the bay. Although it was midsummer, patches of snow were conspicuous on their northern slopes. At the entrance to Hamilton Inlet, the distant peaks of this range are seen stretching away to the south. Southwest of the contracted channel called "The Narrows," on which Rigolet is situated, the Mealy Mountains approach Melville Bay, giving a picturesque aspect to the southern shore of that great salt water basin. These mountains rise quite abruptly a few miles from the bay and appear to have an average height of about one thousand four hundred feet. They are said to be of volcanic structure and are remarkable for the regularity of the sky line which they present in many places. As we departed from the coast the appearance of the country became more attractive. A stunted growth of spruce covered the hills and a thick mantle of firs and moss softened the outlines of the rocky islands. Owing to continuous calms, our progress was provokingly slow and ample opportunity was given for sketching and studying the country. To the north, extended a rolling, hilly region monotonous in comparison with the bolder country to the south. As we approached the western end of the bay, however, a conspicuous peak was seen rising from a chain of hills about ten miles from the north shore of the bay. This mountain, which is called Makaumé by the Hudson's Bay Company officials, from its isolation as well as its height, dominates the entire surrounding country, forming a conspicuous landmark for many miles. I subsequently

learned from the Mountaineer Indians that their name for this mountain is Pootakabooshkow (that which rises up). They endow this eminence with the same supernatural attributes which their brethren of the southwest ascribe to the great rock of Lake Mistassini; and, when passing near, on no account can they be persuaded to point or refer to it, believing such ill conduct the inevitable forerunner of stormy weather and misfortune.

We arrived at North-west River Post at the head of the Bay, on July 27th. This is the most inland station of the Hudson's Bay Company on the Atlantic seaboard, and is the chief trading point of the Montagnais or Mountaineer Indians, who make annual visits to this post to meet the Roman Catholic missionary, and to exchange the outcome of their winter's trapping for supplies and ammunition. Many of the Indians had already visited the post and returned to the interior, but quite a number were still encamped in the neighborhood. The Grand River flows into the bay twenty-five miles from here, and at this point preparations were made to ascend the river. I was convinced that the proper method of ascending the Grand River, a swift-flowing stream abounding in rapids, was to secure a number of canoes and Indians to man them. With two large canoes in addition to our own, and a crew of natives acquainted with the country, we were prepared to attempt the difficulties of river navigation, with a fair prospect of achieving the object of the trip. A serious disappointment, as far as this part of our plan was concerned, was in store for us. A whole week was wasted in the vain endeavor to secure Indian guides and helpers in our enterprise. In addition to their disinclination to engage in an undertaking involving so much hard work, we found that a superstitious dread of the Falls obtained

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NORTHWEST RIVER POST. (FROM A PHOTOGRAPH.)

among them. They firmly believe the place to be the haunt of evil spirits, and assert that death will soon overtake the venturesome mortal who dares to look upon the mysterious cataract.

While at Rigolet, I had the pleasure of meeting Père Lemoine, the French Canadian missionary, who was returning from his annual visit to the Indians at Northwest River. He gave me much information about the Indians, and talked most entertainingly of his work. Soon after reaching the post, in company with an interpreter, I visited a camp of the Indians on Grand Lake with the object of securing a crew for my river journey. On leaving Rigolet, Père Lemoine had handed me a letter to the Indians, written in their own language and accompanied with a translation. In this communication he commended me in the most simple and dignified terms to the members of his roaming flock, and invoked their aid in helping me on my journey. In spite of this credential, however, I found, after a two hours' interview, that it would be out of the question to look for aid in this quarter, as no inducements I could hold out were strong enough to overcome their objections to the undertaking.

According to a census taken by the Newfoundland Government in 1891, the entire population of Labrador on the east coast from Blanc Sablon to Cape Chudleigh numbered but four thousand one hundred, and this doubtless included Indians, Eskimos, Whites and Half-breeds. The Eskimos live on the coast, and seldom venture far into the interior. Hamilton Inlet may be regarded as the southern boundary of their habitat, which stretches north to the shores of Hudson Strait. Contact with civilization seems to lessen the vitality of this interesting race, and the Moravian missionaries declare that, like the Eskimos of

Alaska, they are gradually decreasing in numbers. The great inland plateau, dotted with innumerable lakes, is the home of the Indians. These belong to the Cree nation of the north-west, and are divided into two families: the Montagnais, or Mountaineers, who are found as far west as Lake St. John in the Province of Quebec, and the Nascopies, a less numerous tribe, who dwell on the barren grounds extending to the far north.

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GRAND
FALLS
Height 316'

Lake

Islands

SKETCH MAP
OF
GRAND RIVER
LABRADOR

C. A. KENASTON, 1891

SCALE OF MILES
0 5 10 15 20

The figures show elevations above
the surface of the river in feet

Elizabeth

Wanapow Lake
Depth 106'

Mouni Rapids

Magnetic Va
about 57'

APPROXIMATE MAGNETIC

Ninnipi R

Ninnipi R

rador are nominally
lics; but as the minis-
the priest extend over a
period of only three weeks
each year—during which
all marriages and baptisms are solemnized—there is time in the long interval for many of the precepts of the Church to be forgotten and for inherent superstition to assert itself. The heathen element is exemplified in the survival of the native “medicine men” or “conjurers,” as they are termed, who undoubtedly wield much influence over their followers. The priest exerts himself to lessen the authority of this savage hierarchy; but it is well known that, away from his watchful care, the old barbaric incanta-

tions and prophecies are still practised.¹⁰ For many years past, the sale of spirituous liquors to the Indians has been interdicted, and they possess many of the virtues of isolated native communities, while their proficiency in reading and writing their native language is extraordinary, when their limited opportunities are taken into consideration. These Labrador Indians are specimens of a primitive race who show but few evidences of contact with white men. In fact, aside from the priest and the local representative of the Company, they rarely encounter any white men, and their mode of life and customs present many aspects of interest to the ethnologist. The caribou, or reindeer, furnishes the chief item of their food supply, and likewise provides them with covers for their wigwams and material for clothing. The winter of 1890-91 was notable for the great scarcity of this animal and a consequent famine among the Indians of this part of Labrador.

A vast extent of territory is covered by these natives in their wanderings. Small companies, consisting of three or four families, usually travel together. In summer, their

¹⁰ A Labrador correspondent, under date of August 13, 1893, informs me that the Roman Catholic mission to the Indians at North-west River, for many years under the care of the Oblate Fathers, has recently been abandoned.

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Alaska, they are gradually decreasing in numbers. The

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**GRAND
FALLS**
Height 316

Lookout.
80
100
120

Islands

SKETCH MAP
OF
GRAND RIVER
LABRADOR

C.A. KENASTON, 1891

SCALE OF MILES
0 5 10 15 20

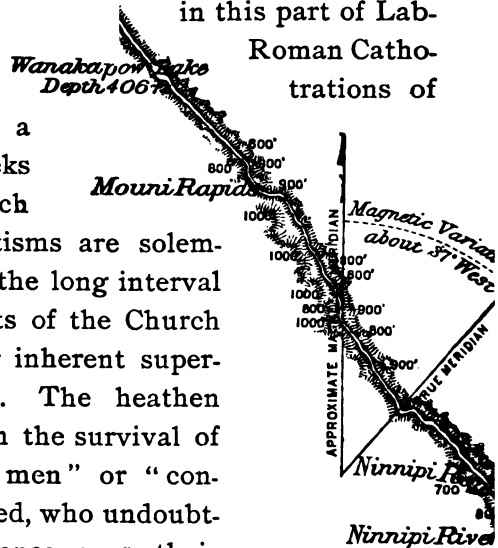
The figures show elevations above
the surface of the river in feet

Elizabeth

rador are nominally
lic; but as the minis-
the priest extend over a
period of only three weeks
each year—during which
all marriages and baptisms are solemnized—there is time in the long interval for many of the precepts of the Church to be forgotten and for inherent superstition to assert itself. The heathen element is exemplified in the survival of the native “medicine men” or “conjurers,” as they are termed, who undoubtedly wield much influence over their followers. The priest exerts himself to lessen the authority of this savage hierarchy; but it is well known that, away from his watchful care, the old barbaric incanta-

great inland plateau, dotted with innumerable lakes, is the home of the Indians. These belong to the Cree nation of the north-west, and are divided into two families: the Montagnais, or Mountaineers, who are found as far west as Lake St. John in the Province of Quebec, and the Nascopies, a less numerous tribe, who dwell on the barren grounds extending to the far north.

All the Indians
in this part of Lab-
Roman Catho-
trations of

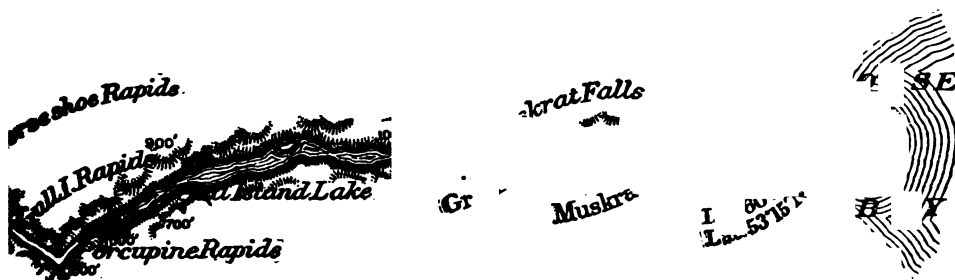


tions and prophecies are still practised.¹⁰ For many years past, the sale of spirituous liquors to the Indians has been interdicted, and they possess many of the virtues of isolated native communities, while their proficiency in reading and writing their native language is extraordinary, when their limited opportunities are taken into consideration. These Labrador Indians are specimens of a primitive race who show but few evidences of contact with white men. In fact, aside from the priest and the local representative of the Company, they rarely encounter any white men, and their mode of life and customs present many aspects of interest to the ethnologist. The caribou, or reindeer, furnishes the chief item of their food supply, and likewise provides them with covers for their wigwams and material for clothing. The winter of 1890-91 was notable for the great scarcity of this animal and a consequent famine among the Indians of this part of Labrador.

A vast extent of territory is covered by these natives in their wanderings. Small companies, consisting of three or four families, usually travel together. In summer, their

¹⁰ A Labrador correspondent, under date of August 13, 1893, informs me that the Roman Catholic mission to the Indians at North-west River, for many years under the care of the Oblate Fathers, has recently been abandoned.

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birch-bark canoes traverse the rivers and the chains of lakes which extend in all directions. In winter, they wander about in pursuit of game and engage in trapping, traveling over the snow on their cumbersome, circular snowshoes, and dragging their toboggan-shaped sledges behind them. Early marriages are the rule among them, eighteen being the average age of the men, while the women are usually two years younger when they assume the responsibilities of matrimony.

Unlike most Indian tribes, the Mountaineers, as far as I have been able to learn, have but elementary ideas of self-government, and hereditary or elective chiefs do not exist among them. The explanation of this may be found in their exemption from wars for many generations. Traditions of conflicts with the Eskimos still exist among them, and it is reasonable to suppose that chiefs were recognized among them at that time in their history.¹¹

The Nascopies, who dwell about the lacustrine basins of the northern part of the inland plateau, are closely allied to the Mountaineers in language and habits, but are a more hardy and primitive people. Their clothing is entirely composed of deer-skins, and many have no intercourse whatever with white men. Numbers of them, however, make annual visits to Fort Chimo, the station of the Hudson's Bay Company near Ungava Bay, where, in exchange for their pelts, they obtain flour, ammunition and a few other articles. With these products of civilization they fortify themselves in the battle with nature which mere existence in those sterile regions implies. The for-

¹¹ Eskimo Island, twelve miles west of Rigolet, in Melville Bay, is pointed out as being the scene of the last great battle between these hereditary enemies. Eskimo graves and the remains of rude breastworks are still to be found there. Tradition holds that the battle resulted in the defeat of the Eskimos.

mer Roman Catholic missionary, Père Lecasse, on two occasions extended his journeys as far north as Fort Chimo, in order to meet the Nascopies who resorted there for trade; but it is said the principles of Christianity have made but little headway among them. I am informed by one who spent two years at this Fort, that the savage custom of killing the aged and helpless still prevails among the Nascopies. The victim is not despatched outright, however, but is supplied with sufficient food to last a few days and is then abandoned to a cruel death by starvation.

Thwarted in our plan of Indian coöperation, we nevertheless resolved to make the best of the situation, and our party on starting up the river comprised, besides Prof. Kenaston and myself, John Montague and Geoffrey Ban.

Montague, a strong young Scotchman, proved to be a valuable addition to our party. Emigrating from the Orkney Islands when a boy, he had for years followed the life of a "planter;" that is, had engaged in the fisheries during the summer and trapped in the winter, drawing his supplies from the Hudson's Bay Company and trading exclusively with them. He accompanied Mr. Holme on his journey in 1887, and was well acquainted with the lower part of the river. Geoffrey was a full-blooded Eskimo, twenty-five years old, born at Okkak on the north eastern coast. He was a typical specimen of his race and closely resembled the more primitive members of the Eskimo family, whom I subsequently encountered in north Greenland in the summer of 1892. Of strong and stocky build, he possessed likewise a swarthy, Tartar cast of features, and a cheerfulness of disposition which the vicissitudes of travel seldom ruffled.

A strong river boat, eighteen feet in length, was obtained for the trip, and in this were placed the supplies, instruments and other necessary luggage for the journey. The canoe containing the tent and a few smaller articles, was tied to the stern.

On August 3d, our little company bade adieu to Mr. Charles McLaren, the officer in charge of North-west River Post, and turned our faces towards the wilderness. After advancing a distance of fifteen miles to the south, an adverse wind arose and we camped for the night on Rabbit Island, in Goose Bay, five miles from the mouth of Grand River.

The following day, after a sail of an hour and a half, we entered the river, which at its mouth, is over a mile in width. The shores of Goose Bay are quite low at this point, and the approach is not impressive. Vast quantities of sand and *débris* are washed down by the river in the spring, and sand bars form at the mouth, making it difficult to follow a continuous channel for any length of time. Partly submerged stumps and logs appeared at intervals. There is an appreciable tide at the mouth of the river, but the rise and fall does not usually exceed two feet. Passing Man-of-War Island and the mouth of Travispines River, a stiff easterly wind bore us swiftly along, and a total distance of twenty-five miles was covered before we made camp. For the first fifteen miles steep sand banks characterized both sides of the river.

As we rowed up stream the next day, the northern shore presented steep banks of whitish clay, whose sides were furrowed by rain channels. Along the shore, curious clay concretions, in grotesque shapes, were found in profusion, the result, possibly, of the union of the sand in suspension in the river and the kaoline soil carried by erosive agencies

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PART OF THE LOWER OR MUSKRAT FALLS OF THE GRAND RIVER. (FROM A PHOTOGRAPH.)



into the stream. Interesting little creatures, called jumping mice (*Zapus Hudsonius*), were observed in the vicinity; but they carefully avoided the traps set for them.

By noon we arrived at the base of the lower falls of the river, called Muskrat Falls by the trappers. Just above this point the Grand River swings around from the north and forms a basin over half a mile in width. At the lower end of this, a chain of hills encroaches on the bed of the river, contracting the channel and presenting a rocky bulwark, through which the stream has forced its course. There are two steps in the descent, and the total drop to the falls was ascertained to be sixty-six feet, while the width of the narrow rapid between the upper and lower fall was found by Prof. Kenaston to be three hundred and twenty feet.

To circumvent the falls a difficult "carry" was necessary, involving a steep ascent of two hundred and ten feet, then a trail of half a mile through a forest of birch and spruce trees, and finally an abrupt descent to the river.

The unwieldy character of our boat, which weighed over five hundred pounds, was now a serious disadvantage. By means of a block and tackle we dragged it up the precipitous banks, and after much laborious lifting and pulling, launched it on the river above the falls. This operation, and the "packing" of the "stuff" across, occupied a day and a half. During our subsequent advance of about one hundred and seventy-five miles up the river, oars and paddles were, for the most part, of little use, owing to the swiftness of the current. The only exceptions were along a part of the river known as "Slackwater," and on Lake Wanakopow, where we enjoyed the luxury of a sail for forty miles. The usual method employed was what is

technically known as "tracking." That is, a strong rope, about the thickness of a clothes-line, was tied to the gunwale of the boat just aft of the bow. To the shore end of this broad leather straps were attached. With these across their shoulders, three of the party tugged away along the rocky bank, while number four of our crew, with an oar lashed in the stern, steered a devious course among the rocks and shallows of the river. The "tow-path" in this instance was of the roughest and most diversified character. Sandy terraces and extended reaches covered with glacial boulders characterized the lower portion of the river, while further up stream, great numbers of smaller boulders, insecurely lodged on the precipitous sandy banks, would baffle us by the precarious footing they afforded. Where a combination of this "rubble" and a troublesome rapid occurred, it was only by the most violent exertion and no end of slipping and sliding that the tension of the tow-line could be maintained on the treacherous ground. Then, again, stretches of steep rocky bank, where no tracking was possible, would often compel us to scale the rugged cliffs and pass the line from one to another over various obstacles. Wading through the water was frequently the only resource. This was always the case when we reached a place in the river where the spring freshets had undermined the banks, and where numbers of trees, stumps and underbrush littered the shore, forming *chevaux-de-frise* of the most formidable character.

The long daylight of midsummer in this subarctic region was a point in our favor, enabling us to work to the limit of our strength. Here, indeed, we found that "Night and day hold each other's hands upon the hill-tops. . . .

No sooner does the sun set north by west, then, like a giant refreshed, it rises again north by east."¹²

On the fourth day from the mouth of the river, we passed Porcupine Rapids without difficulty, having ascended a distance of fifty-seven miles. Our camp for the evening was in a pleasant grove recently vacated by the Indians. Here we found a number of the curious wicker frames which the natives use in bathing. These frames are covered with deer-skins and are erected over holes in the ground, into which a number of large stones, previously heated, are rolled. The bather is then placed within, and water thrown on the stones, thus creating an intensely hot vapor. Forests of evergreens extended back on both sides, and a notable increase in the size of the firs and spruces was observed as we advanced into the interior. Deposits of magnetic iron ore sand were observed on the banks of the river here as well as elsewhere in the lower part of its course. On August 9th, we reached the head of Gull Island Lake, which is nothing but a widening of the river. The lake is a favorite resort of the Canada goose, and its waters contain large numbers of white fish, pickerel and suckers. Above Gull Island Lake, the valley of the river contracts gradually; the sandy terraces disappear, and sloping banks, strewn with erratics, are encountered for many miles.

The next day, when a few miles above the lake, we beheld the white crests of Gull Island Rapids ahead of us. This was one of the dangerous points in our course, and we approached it with caution, taking advantage of eddies along the shore, where a reverse current often aided our

¹² Lambert de Boilieu. *Recollections of Labrador Life*. London. 1861.

advance. The successful rounding of a point or the surmountal of a bad rapid was always attended with excitement. The canoe capsized at one point; but as the contents were lashed in, nothing was lost by the accident. We found it impossible to drag the heavily-loaded boat against the current at another place, and were compelled to unload and carry the stores around the worst part of the rapid. On this day we made but four miles. The current was now uniformly swift, running at about eight miles an hour. Parts of two days were consumed in conquering Horseshoe Rapid, which is divided into three distinct rapids.

On August 13th, we passed the Ninnipi Rapids. These compare with Gull Island Rapids in difficulty, and necessitated detaching the canoe and "packing" the boat's freight along shore as in the previous instance.

Judged by ordinary standards of travel, our advance up the river was slow indeed; but to those who are familiar with canoe transportation on Canadian rivers, I am sure our progress will appear respectable, when the unwieldly character of our boat is taken into consideration. There seems to be something positively personal and vindictive in the resistance which rapids make to a traveller's advance into a wild and mountainous country. There was, accordingly, a cumulative feeling of satisfaction as one after another of these barriers of nature's making were surmounted. In the swollen condition of the river, the struggle with these wild rapids was often as savage and exhilarating as one could desire. John and myself usually took the lead on the tow-line, Geoffrey busying himself with keeping the line clear of snags, while to Prof. Kenaston was assigned the steersman's part. Bending to their work, the linemen would clamber along the bank,



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PACKING AROUND THE NINIHI RAPIDS. (FROM A PHOTOGRAPH.)

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dragging the slowing yielding mass up stream. Ofttimes the force of the current would carry out the boat far into mid-stream, until the full length of line would be exhausted. We could do nothing then; but hang on like grim death and watch our craft toss and roll amid the billows, until, like a spirited horse, gradually yielding to the strain, she would turn her head shorewards. Prof. Kenaston meanwhile, with tense muscles bending to the steering oar, skilfully guided his charge amid the encompassing rocks and eddies—the only quiet figure on the surging flood of the river. At the Ninnipi Rapids the stream narrows perceptibly, and the mountains, covered with a dense growth of burnt timber, reach to the water's edge. The Ninnipi River here enters the Grand River from the southwest, and forms part of a canoe route used by the Indians in going to the Gulf of St. Lawrence. On August 14th, we traversed a portion of the river which Montague called Slackwater. Here, owing to the long stretches of smooth water, and infrequent rapids, rowing became practicable, and a distance of twenty miles was covered in two days. For a good portion of this distance the adjacent hills were covered with burnt timber, which gave a sombre aspect to the landscape.

The current now became swifter and the tracking more arduous. On August 18th, the canoe capsized twice while dragging behind the boat. On the second of these occasions, when in the midst of a stubborn rapid, the weight of the submerged canoe and the heavy boat proved to be too much for the strong tracking line, and it broke, treating the steersman to an involuntary ride down stream for several hundred yards. On August 19th, the Mouni Rapids showed their troubled waters ahead of us. These were the last ones of a formidable nature we encountered,

and owing to the swollen condition of the river they gave us a hard tussle before they were conquered. They extend over a longer distance than any of the others, and the aneroid readings which I recorded from time to time showed a greater drop here in the bed of the river than at any other point.

Looking back on these days spent along the river, I recall how each one was filled with incident and how all were stimulated by the uncertainty of what lay before us. It is the experience of many, that in recalling travels of this kind, the pleasant features of the time are remembered with more distinctness than the trying ones. So in the retrospect of this journey, many of the incidents, unpleasant at the time, are softened by time's perspective, while the bright ones stand out in bolder relief and recur to the memory with pleasure. One awkward adventure, however, which occurred on this first day on the Mouni Rapids, I have not yet succeeded in relegating to the realm of forgetfulness. We were approaching a rocky point, similar to many others we had encountered, past which the water dashed with angry violence. It was our custom on reaching such a place, to first detach the canoe, and then to shove out the boat obliquely from the still water, to allow her bow to fairly meet the swifter current. On this occasion, while Montague and I, facing up stream, were waiting on the bank above for the signal to advance, the boat, through some carelessness, was pushed out from the quiet eddy squarely into the swift water. The full force of the torrent struck her abeam, and away she swept down stream like a thing possessed. Taken unawares, no time was given to throw off the leather straps from our shoulders, and instantly we were thrown from our feet and dragged over the rocks into the river by

the merciless strength of the flood. Most fortunately for me, the circular strap slipped over my head, as I was being dragged through the water. Montague's also released itself, and the runaway sped down stream a quarter of a mile before stopping. On clambering up the bank, I found Montague stunned and bleeding from a scalp wound. Aside from some abrasions of the skin, I was none the worse for the shaking up, and after a brief delay Montague revived and we resumed our "tow-path" exercise.

The popular impression that Labrador possesses a climate which even in summer is too rigorous for the enjoyment of open-air life, was not verified on this trip. The temperature during the day was found to be delightful—just cool enough to be stimulating; while the average minimum temperature registered during the forty-one nights of the journey was ascertained to be but forty-two degrees Fahrenheit. Nor was verdure lacking in this sub-arctic landscape, for dense growths of spruce and fir extended back for miles into the blue distance, and even where fire had blackened the slopes of adjacent hills, the sombre aspect of the scene was much relieved by a second growth, which showed the delicate green of its leaves among the charred remains of the original forest. Game and fish proved to be fairly abundant, and two fine black bears were killed by members of the party. The fresh meat thus obtained, together with the trout captured from time to time, made welcome variations in the dietary of the expedition.

The declining sun of August 20th beheld our small craft glide into the smooth waters of Lake Wanakopow. The first view of the lake was beautiful, and most grateful to our eyes after the long struggle with the rapids. Even Geoffrey and John, usually indifferent to scenic effects,

could not conceal their admiration as we glided by towering cliffs and wooded headlands, and beheld at intervals cascades leaping from the rocks into the lake, their silvery outlines glistening in the sun and contrasting distinctly with the environment of dark evergreen foliage. This romantic sheet of water stretches in a north-easterly and south-westerly direction a distance of about thirty-five miles, and has an elevation above sea level, according to my aneroid observations, of four hundred and sixty-two feet. Low mountains of granite and gneiss rise on both sides, and the average width of the lake is less than one mile. A sounding taken near the middle showed a depth of four hundred and six feet. This narrow elevated basin is probably of glacial origin, the presence of great numbers of boulders and the rounded appearance of the hill summits, pointing to a period of ice movement. On Saturday, August 22d, we made a good run up the lake, passing Mr. Holme's farthest point, and camped on the river bank three miles above the lake, opposite the mouth of the Elizabeth River, which here enters the Grand from the west. The next day we rested in camp; taking occasion to overhaul our boat and canoe and repair clothing and outfit, preparatory to entering the *terra incognita* which lay before us. The following day we made ten miles, there being but little current to contend against. The river retained its width to a marked degree, and frequent placid expanses, having all the appearance of mountain lakes, revealed themselves as we turned the bends of the stream. About ten miles above the lake a very considerable river flows in from the east. On subsequent inquiry from the Indians, I was unable to learn of the existence of any native name for this stream. On August 25th, a cold rain poured down all day, but the river pre-

sented no special difficulties, and we made eleven miles progress. Thirteen miles more were covered the following day, the water meantime becoming more shallow and lofty hills arising from the shore.

We had now reached a point over fifty miles above the middle of Lake Wanakopow, where Mr. Holme had been obliged to turn back. On his map he places the Grand Falls thirty miles above the lake, and represents the river as approaching the lake from a point west of south from the lake itself. We had ascertained that the river entered the lake from the west, instead of from the south-west, and we were likewise forced to realize that Mr. Holme was mistaken in his location of the Falls, as we had already reached a point considerably beyond their assumed position. On August 27th, after advancing three miles, we came to a wide, shallow rapid, over which it was impossible to draw the boat. Finding no possible channel in the river, we judged that we were in the neighborhood of the "Big Hill," the head of boat navigation and the point where the Indian *voyageurs* left the river, in the old days when the Hudson's Bay Company sent crews to their inland post.

While at the North-west River Post we had learned from a reliable Indian, that the old trail, long disused, led from this point on the river to a chain of lakes on the table-land. By following these lakes and crossing the intervening "carries," the rapid water which extends for twenty-five miles below the Falls could be circumvented and the traveller brought finally to the waters of the Grand River, many miles above the Grand Falls. Our plan was to follow this old trail for several days, and then to leave the canoe and strike across country in a direction which we hoped would bring us again to the river in the

vicinity of the Falls. It was deemed best to follow this circuitous canoe route, rather than to attempt to follow the banks of the river on foot, in which case everything would have to be carried on our backs through dense forests for many miles.

After a long search, the old trail was found, and leaving Geoffrey in charge of the main camp on the river, the other members of the party took the canoe and a week's provisions, and began the ascent of the steep path which led up to the edge of the elevated plateau, which here approaches the river. Making a "carry" of three miles to the north along the old trail, we reached the first of the chain of lakes, where we erected a rude shelter and camped for the night. A violent storm arose during the night, and next day we lost much time in seeking for the continuation of the trail on the opposite side of the lake. Having been disused for twenty-seven years, the path, where it came out on the lake shore, was distinguished by no "blazes" on the trees, or recent choppings. This necessitated a careful examination of the shores on all the lakes, and caused considerable delay.

We were now on the great table-land of the Labrador interior, and wishing to get a good outlook, climbed a conspicuous hill nearby, to scan the adjacent country: A view truly strange and impressive was before us. As far as the eye could reach, extended an undulating country, sparsely covered with stunted spruce trees, among which great weather-worn rocks gleamed, while on all sides white patches of caribou moss gave a snowy effect to the scene. A hundred shallow lakes reflected the fleeting clouds above, their banks lined with boulders, and presenting a labyrinth of channels and island passages. Low hills arose at intervals among the bogs and lakes; but the

general effect of the landscape was that of flatness and bleak monotony.

The continuation of the old Nascopie trail remaining invisible, to escape the discomfort of another rainy night on the plateau, we returned to the shelter of the camp on the river. On August 30th, we returned to Geoffrey Lake, where our patient search for the trail was at last successful.

Next day we advanced along the trail which led us over four "carries" and across five lakes. For convenience of reference, we applied names to some of these small sheets of water. Thus, the third one of the chain was designated "Gentian Lake," from finding the closed variety of the blue gentian growing on its borders. The next day we turned aside from the dim trail and paddled to the north-western extremity of the sixth lake, where we drew the canoe ashore and prepared for the tramp across country. Arrayed in heavy marching order, and carrying nearly all that remained of our provisions, we were soon advancing westward on a course which we hoped would soon bring us to the river in the vicinity of the Falls. The country we were now passing through was of the most desolate character, denuded of trees and the surface covered with caribou moss, Labrador tea plants, blueberry bushes, and thousands of boulders. By keeping to the ridges, fair progress was made; but when compelled to leave the higher ground and skirt the borders of the lakes, dense thickets of alders and willows were encountered, and these greatly impeded our advance. Language seems inadequate to describe the desolation of this upland landscape. No living thing was encountered, and the silence of primordial time reigned supreme.

Just before sunset we went into camp on a hillside near a large lake, and soon after, from the top of a high

rock, beheld a great column of mist rising like smoke against the western sky. This we knew marked the position of the Falls, and needless to say, our spirits rose—oblivious of our bleak surroundings—as we contemplated the near attainment of our journey's end. During the night the thermometer registered a minimum temperature of forty-one degrees, and we were treated to a superb display of Northern Lights.

September 2d was a day memorable as marking the date of our arrival at the Grand Falls. A rough march over the rocks and bogs intervened, however, before we reached this goal. As we approached the river, spruce forests of a heavier growth appeared, and pressing on through these, although we could no longer see the overhanging mist, the deep roar of falling waters was borne to our ears with growing distinctness. After what seemed an intolerable length of time—so great was our eagerness—a space of light in the trees ahead made known the presence of the river. Quickening our steps, we pushed on, and with beating hearts emerged from the forest near the spot where the river plunged into the chasm with a deafening roar.

A single glance showed that we had before us one of the greatest waterfalls in the world. Standing at the rocky brink of the chasm, a wild and tumultuous scene lay before us, a scene possessing elements of sublimity and with details not to be apprehended in the first moments of wondering contemplation. Far up stream one beheld the surging, fleecy waters and tempestuous billows, dashing high their crests of foam, all forced onward with resistless power towards the steep rock, whence they took their wild leap into the deep pool below. Turning to the very brink and looking over, we gazed into a world of mists and mighty reverberations. Here the exquisite

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CROSS VIEW OF THE RAPIDS NEAR THE BRINK OF THE GRAND FALLS. (FROM A PHOTOGRAPH.)

colors of the rainbow fascinated the eye, and majestic sounds of falling waters continued the pean of the ages. Below and beyond the seething caldron the river appeared, pursuing its turbulent career, past frowning cliffs and over miles of rapids, where it heard "no sound save its own dashings." The babel of waters made conversation a matter of difficulty, and after a mute exchange of congratulations, we turned our attention to examining the river in detail above and below the Falls.

A mile above the main leap, the river is a noble stream four hundred yards wide, already flowing at an accelerated speed. Four rapids, marking successive depressions in the river bed, intervene between this point and the Falls. At the first rapid the width of the stream is not more than one hundred and seventy-five yards, and from thence rapidly contracts until reaching a point above the escarpment proper, where the entire column of fleecy water is compressed within rocky banks not more than fifty yards apart.

Here the effect of resistless power is extremely fine. The maddened waters sweeping downwards with terrific force, rise in great surging billows high above the encompassing banks ere they finally hurl themselves into the gulf below. A great pillar of mist rises from the spot, and numerous rainbows span the watery abyss, constantly forming and disappearing amid the clouds of spray. An immense volume of water precipitates itself over the rocky ledge, and under favorable conditions the roar of the cataract can be heard for twenty miles. Below the falls, the river turning to the south-east, pursues its maddened career for twenty-five miles shut in by vertical cliffs of gneissic rock which rises in places to a height of four hundred feet. The rocky banks above and below the falls

are thickly wooded with firs and spruces, among which the graceful form of the white birch appears in places.

Soon after our arrival, Prof. Kenaston, with Montague's aid, set about making a measurement of the falls. In an address delivered before the National Geographic Society, January 29, 1892, Prof. Kenaston described the method employed as follows: "At St. Johns, Newfoundland, we had provided ourselves with several balls of stout linen cord with which to measure the height of the fall, if the situation should be found suitable. Fortunately, alongside the chute just above the brink of the main cataract, we found a floor of rock of the same slope, about thirty degrees below the horizontal. Along this it was possible to go, but with some peril, nearly to the edge over which the stream plunges in its final descent. Fastening a heavy billet of green fir to one end of the cord, the weight was carried and thrown down on the surface of the rock to the brink of the falls, the cord being paid out from the upper end of the slope. A knot was made in the cord to mark the distance to the edge, and the billet was allowed to fall over the edge of the precipice into the chasm. Montague, having climbed along the bank at the edge of the cañon, was holding on by the trunk of a tree, from which he could see when the block of wood struck the water below as the cord was paid out by me above. The instant of contact was plainly visible to him, and and I was equally sensible of it. The cord was now drawn up over the edge and carefully measured with a tape-line. The whole length paid out was five hundred and five feet, the part which measured the slope was one hundred and eighty-nine feet, leaving for the height of the main fall below the chute, three hundred and sixteen feet. Allowing for a few degrees deviation from the perpendicular, and for

a slight stretching of the cord, though this last was probably counteracted by wetting, the height of the fall may be considered something more than three hundred feet. The vertical height of the chute, about thirty-two feet added to the other measurement, makes the descent from the head of the chute to the surface of the water in the chasm about three hundred and forty-eight feet."

While Prof. Kenaston and Montague were making this direct measurement of the Falls, an incident occurred which illustrated the cool daring of the latter in a striking manner. The water, at the time of our visit, was probably as low as it ever is in the Grand River. In fact, from the *débris* lodged high up on the banks, we judged the stream had fallen at least ten feet from the high-water mark of the spring freshets. This drop in the river left exposed a considerable surface of the rocky ledge which was usually covered by water, forming part of the brink of the fall. After measuring the length of the preliminary incline leading to the main leap, Montague was directed to cast the plummet-line over the rocky edge of the escarpment, in order to secure the measurement of the principal fall. This was done; but while Prof. Kenaston was paying out the line, it caught in a slight crevice, and to complete the measurement it became necessary to free it at once. Without a moment's hesitation, our brave John clambered down the steep bank and walked out on the very brink of the chasm, where, stooping down, with the spray of the passing flood wetting his cheek, he loosened the line and returned to the bank in safety. A single misstep or the slightest giddiness on his part, while on that dizzy height, would have resulted tragically. But to think was to act with this hardy Scotchman, and, truly, his cool head and nerve served him well on this occasion.

While these direct measurements were being made, I turned my attention to obtaining a number of photographs of the falls and rapids, and then to securing the barometric readings above and below the cataract. In order to obtain an observation at the lower bed of the river, it was necessary to descend the steep walls of the cañon. This I found to be a hazardous and exciting undertaking. Walking along the edge of the gorge just below the falls, two places seemed to offer possible means of access to the river below. At both points I attempted the descent, only to find, after lowering myself from tree to tree down the bank, that a sheer precipice extended the remaining fifty or seventy-five feet to the surface of the water. On the third trial, by following the course of a tiny streamlet the bed of the river was finally reached. By this time the day was far spent, and darkness almost enveloped the scene down in that imprisoned channel bed. The situation was interesting, and filled with the charm of a first glimpse into one of nature's solitudes. In front, the great river, roaring hoarsely in the gloom, and just entering on its final journey over miles of rapids to the sea. On the opposite bank, a splendid cliff of pinkish hue led the eye from the gloomy base, in one long sweep hundreds of feet aloft to the utmost pinnacle, which still glowed a few brief moments in the departing rays of the sun.

The aneroid reading and the temperature recorded, a few minutes were given to contemplating the strange beauty of the scene, and then began the toilsome climb to the upper world. Darkness had settled over all when I clambered over the edge above and made my way through the forest to the camp, just above the falls. My long absence had alarmed my companions, who welcomed my appearance within the circle of the camp-fire with expres-

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RAPIDS ABOVE THE GRAND FALLS. (FROM A PHOTOGRAPH TAKEN 250 FEET ABOVE THE BRINK.)

sions of relief. It was after nine o'clock when I sat down to a frugal supper that night, somewhat footsore and weary after the stirring events of the day.

The difficulties of obtaining near views of large masses of falling water are admitted by all photographers. In the case of the Grand Falls, this is increased by the character of the surroundings. The great volume of water compressed as it is, and discharging itself through a funnel-like channel in the rocks, falls in a thick narrow column a distance of three hundred and sixteen feet, sending up banks of vapor and presenting the appearance from a distance of a great pillar of cloud. The vegetation is affected by this vapory condition of the atmosphere, and thin patches of green moss, unlike anything seen elsewhere, were conspicuous on the face of the cliffs just below the Falls. Notwithstanding the apparent futility of the attempt, I endeavored to obtain two views looking across the main leap, from the bank near the brink. These negatives proved to be failures on development. By descending the bank as far as the steep incline permitted and hanging to the roots of the dwarf fir trees growing thereabouts, I was able, by watching for a favorable moment when the veil of mist lightened, to secure a near view of part of the main leap. It was apparent that the best vantage ground for viewing the face of the Fall was from a point where the cañon wall jutted out a short distance into the deep pool below the Falls. This point of view I estimate was from one hundred and fifty to two hundred feet from the column of descending water, and down its rocky edge one could not creep more than fifteen feet before encountering the almost vertical wall which led to the river-bed below. While the rising vapor did not envelope us here as when nearer the brink,

yet the effect of it, rising in banks from the base, while not displeasing to the eye, detracted somewhat from the fine sweep of the Fall, the outline of which we could see descending behind the veil of mist. While on this rocky buttress, I took a photograph of the Falls and one of the lower part of the Falls, showing the mist rising from the bottom, both of which proved to be far from satisfactory.

To explain further the lack of definition in those photographs, I will add that the afternoon was far advanced when they were taken and the light far from good. The sun was already well down in the western sky, across the river from me, and in the worst possible position for my purpose. I emphasize this feature of the occasion, because it materially affected the result; for had the sun shone from the south instead of the west, I think it would have been quite possible to secure a view showing at least the outline of the Falls. On the afternoon in question, however, the conditions were quite the contrary, hence the unsatisfactory results.

In my descent to the bottom of the cañon I carried my camera, but I was unable to obtain a view of the fall from the lower bed of the river, because a projecting point of rock several hundred yards up-stream cut off a distant view of the spectacle. The steep walls of the gorge, against which the water dashed in places, prevented any considerable advance up-stream, and I was reluctantly compelled to abandon my purpose of returning the following morning to secure photographs of the Falls from this lower position.

I felt at the time that while the view of the rapids and cañon promised well, those of the fall could not be otherwise than unsatisfactory. I consoled myself, however, by the thought that the morning light of the following day

would prove more propitious. Great was my disappointment, then, when the third of September dawned a dull and threatening day. The notes in my journal, written at the time, express my keen regret at the turn affairs had taken.

Friends have naïvely remarked, when I expressed my regret at not obtaining a good view of the main Falls, "Why did you not remain encamped at the Falls until you had secured satisfactory photographs of this most important object?" Our provisions were all but exhausted, only enough remaining after breakfast for two scanty meals. To have remained under the circumstances seemed to risk starvation, for owing to the absence of all game from the vicinity there appeared to be no means of eking out our supplies by the usual devices of the woodsman. Thus, I decided to delay no longer for clearing weather; and the two days' storm which supervened proved, I think, the wisdom of the step.

The deep, incessant roar of the cataract that night was our lullaby as, stretched out under a rough "barricade," we glided into that realm of forgetfulness where even surroundings strange as ours counted as naught.

By the morning light we again viewed the wonders of the place, and sought for some sign of the presence of bird or animal in the vicinity; but not a track or the glint of a bird's wing rewarded our quest, and this avoidance of the place by the wild creatures of the forest seemed to add a new element of severity to the eternal loneliness of the spot.

The Grand Falls of Labrador, with their grim environment of time-worn, archaic rocks, are one of the scenic wonders of this Western world, and if nearer civilization, would be visited by thousands of travellers every year. They are nearly twice as high as Niagara, and are only inferior

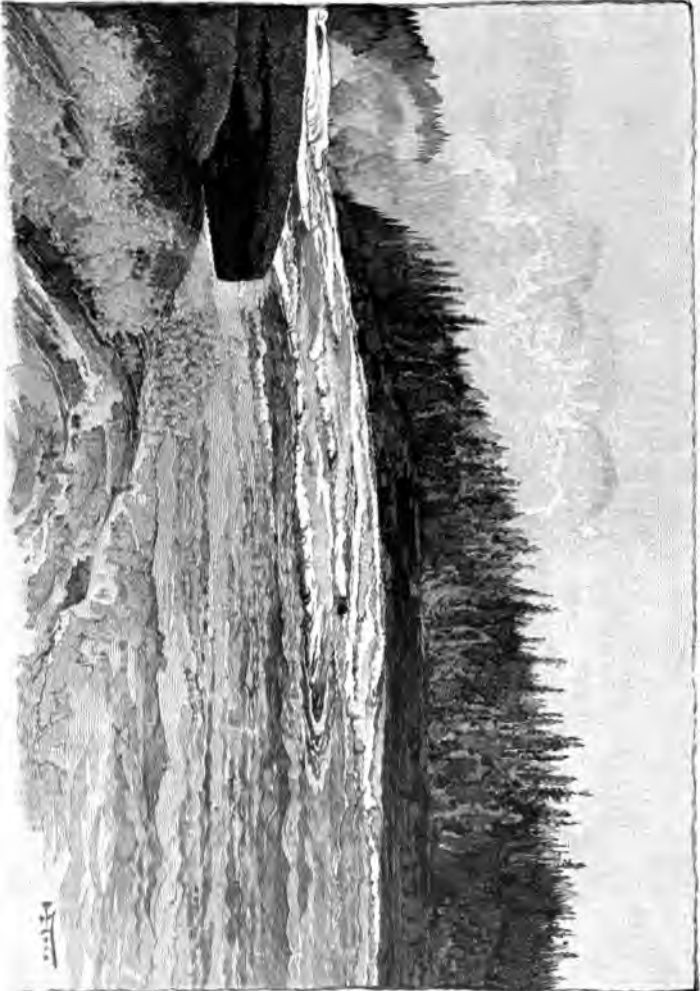
to that marvellous caratact in breadth and volume of water. One of their most striking characteristics is the astonishing leap into space which the torrent makes in discharging itself over its rocky barrier. From the description given of the rapid drop in the river-bed and coincident narrowing of the channel, one can easily understand that the cumulative energy expended in this final leap of the pent-up waters is truly titanic.

If a sub-stratum of softer rock existed here, as at Niagara, a similar "Cave of the Winds" would enable one to penetrate a considerable distance beneath the fall. The uniform structure of the rock, however, prevents any unequal disintegration, and thus the overarching sheet of water covers a nearly perpendicular wall, the base of which is washed by the waters of the lower river. In spite of the fact that no creature, except one with wings, could hope to penetrate this sub-aqueous chamber, the place is inhabited, if we are to believe the traditions of the Labrador Indians. Many years ago, so runs the tale, two Indian maidens, gathering firewood near the Falls, were enticed to the brink and drawn over by the evil spirit of the place. During the long years since then, these unfortunates have been condemned to dwell beneath the fall and forced to toil daily dressing deer-skins; until now, no longer young and beautiful, they can be seen betimes through the mist, trailing their white hair behind them and stretching out shrivelled arms towards any mortal who ventures to visit the confines of their mystic dwelling-place.

The Indian name for the Grand Falls—*Pat-ses-che-wan*—means "The Narrow Place Where the Water Falls." Like the native word *Niagara*—"Thunder of Waters,"—this Indian designation contains a poetic and descriptive quality which it would be hard to improve.

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AT THE BRINK OF THE GRAND FALLS, SHOWING THE CREST OF THE INCLINE. (FROM A PHOTOGRAPH.)

From the point where the river leaves the plateau and plunges into the deep pool below the Falls, its course for twenty-five miles is through one of the most remarkable cañons in the world. From the appearance of the sides of this gorge, and the zigzag line of the river, the indications are that the stream has slowly forced its way through this rocky chasm, cutting its way back, foot by foot, from the edge of the plateau to the present position of the Falls. Recent investigators estimate that a period of six thousand years was required to form the gorge below Niagara Falls; or, in other words, that it has taken that time for the Falls to recede from their former position at Queenstown Heights to their present location. If it has taken this length of time for the Niagara Falls to make their way back a distance of seven miles by the erosive power of the water acting on a soft shale rock supporting a stratum of limestone, the immensity of time involved by assuming that the Grand River cañon was formed in the same way is so great that the mind falters in contemplating it, especially when it is recognized that the escarpment of the Labrador Falls is of hard gneissic rock. And yet no other explanation of the origin of this gorge is acceptable, unless, indeed, we can assume that at some former time a fissure occurred in the earth's crust as a result of igneous agencies, and that this fissure ran in a line identical with the present course of the river; in which case the drainage of the table-land, collecting into the Grand River, would follow the line of least resistance, and in the course of time excavate the fissure into the present proportions of the gorge.

The highest point reached by the expedition was in the vicinity of the Falls, where, according to the aneroid observations obtained, an elevation something in excess of

fifteen hundred feet was noted. Accepting the fact that results obtained by the aneroid barometer are not regarded as conclusive by careful observers, it is, nevertheless, apparent that the altitudes obtained can be taken as at least approximately correct, especially where it is borne in mind that a standard instrument was used, and corrections for temperature made in every instance. Thus it would appear that the idea advanced by Prof. Hind and generally accepted, that the interior table-land of Labrador attains a general elevation of over two thousand feet is erroneous, and future travellers will be called on to confirm or reject this important point relating to the configuration of the interior.

Having accomplished the main object of the trip, we left a record of our visit on the river bank, and set out on our return from this distant end of the expedition. A cold rain poured down during the first day's tramp across the barren plateau, and owing to a mistake in the course taken, we missed our former track, and became entangled in a lacustrine region, where we wandered for hours unable to make any headway among the encompassing lakes. In the humid air landmarks became indistinct, and plunging on through bogs and over sharp rocks, cold, wet, and wearied with the weight of our packs, and with only enough flour remaining for one meal, our condition was unpleasant in the extreme. But dismal thoughts of being lost in this "great and terrible wilderness" incited us to unusual efforts, and at length, by making a long detour, a slight eminence was gained from which we could pick out a course in the desired direction. Late in the day we camped on a hillside under the shelter of a great boulder. During the night the rain continued, accompanied by thunder and lightning, and towards morning a

high wind arose which demolished our "barricade" of sail-cloth and brush. The most comfortless night of the entire trip was passed in this camp on the bleak shores of a lake on this cheerless table-land. Soon after daybreak we each made a breakfast on a cup of hot tea, and resumed our march towards the canoe.

After a rough scramble of nine miles, we arrived at the lake, launched our canoe, and soon after fortified ourselves with a full meal. Returning through the chain of lakes by the route we had recently used, we arrived in due time at the camp on the river, where Geoffrey was awaiting our return with some anxiety. Our trials were almost ended when we reached the river; and having embarked on it, the swift current carried us down stream with exhilarating speed. Delaying only long enough to make a compass survey of the stream, in seven days the mouth of the river was reached without serious mishap—a distance which required nearly a month's hard work in ascending.

A series of fierce gales detained us a week at Northwest River, and we did not arrive at Rigolet until September 22d. Mr. Bell having kindly furnished us with a small schooner, we proceeded in this to Indian Harbor, a fishing station on the coast, where we had the good fortune to find a Norwegian steamship which was about to sail for St. Johns. We were soon established in comfortable quarters on board, and sailing the same day, made a quick run to St. Johns, Newfoundland, from which point I took a steamer to New York, where I arrived on October 15th; thus completing a journey of over four thousand miles.

Among the results obtained by the expedition may be mentioned the following: (1) The measurement of

the height of the Grand Falls. (2) Determination of the altitude of the table-land of south-eastern Labrador. (3) Map of lower course of the Grand River, from compass survey. (4) Meteorological observations extending over the six weeks of the journey. (5) Botanical collection illustrating Labrador flora. (6) Ethnological collection illustrating life and customs of mountaineer Indians and Eskimos.

During the journey we suffered some inconvenience from the absence of two commonplace articles—soap and baking powder; but the most serious affliction we were called on to endure arose from the endless persecution of the black flies and mosquitoes. These venomous insects are said to be worse in Labrador than in any other region, and their baneful presence greatly detracts from the enjoyment of summer travel in that country.

It is to be hoped that the attention of scientific travellers will be drawn to Labrador, which presents almost a virgin field to the investigator.¹² The shortness of the summer season and the sterility of the country preclude the successful tillage of the soil, and, in an agricultural sense, I can see no future for Labrador. But it is evident that the results of exploration in this isolated portion of North America would be of great value to geographical science, while it would not be at all strange if geological discoveries of commercial value would reward the enterprising pioneer in this new field of research.¹³

¹² Valuable and interesting results may be expected from the expedition sent out, in June, 1893, by the Geological and Natural History Survey of Canada, to explore the interior of Labrador. The leader of the expedition is Mr. A. P. Low, an experienced officer of the Survey, who proposes to be absent eighteen months, and to traverse the country north from Lake Mis-tassinini to Ungava Bay and west from Hamilton Inlet to the shores of Hudson Bay.

¹³ Prof. A. S. Packard (Mem. Boston Soc. of Nat. Hist., Vol. I), referring

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THE CAÑON, A QUARTER OF A MILE BELOW THE GRAND FALLS.
(FROM A PHOTOGRAPH.)



In closing, I take the liberty of quoting Dr. M. Harvey, who, in concluding a descriptive account of our journey, remarks :¹⁴

"It will be a long time before the Grand Falls of Labrador become a resort for ordinary tourists. Nature has placed this magnificent cataract in one of her deepest solitudes and guarded the approaches to it with jealous care. For unknown myriads of years its deep, thunderous diapason has been resounding through this grim wilderness. Thousands on thousands of years before the foundations of the Great Pyramid were laid, till the close of the glacial period, when the great ice-cap, three thousand feet thick, was lifted from Labrador, and its river systems were shaped, we must look for the genesis of the Grand Falls. When we look at the great chasm in the solid rock, twenty-five or thirty miles in length, and three hundred feet in depth, which this river has slowly excavated, as it cuts its way backward at the rate of a few feet in a century, we obtain some dim idea of the length of time that has elapsed since its waters began to flow. The imagination faints at the conception. What are we in comparison but ephemera of an hour. Man and all his works are but of yesterday when contrasted with this creation of the gray morning of time in the vast lonely land where desolation sits enthroned for evermore."

to a system of quartzite and trap rocks which extend along the coast about one hundred and twenty-five miles from Domino Harbor to Cape Webuc, gives an interesting account of these strata and remarks: "Should further search prove the existence, in connection with the quartzite of beds of a true conglomerate, which we should look for in the interior, and of the presence of copper ore in connection with quartz veins near the trap rocks, the identity of this formation with the Huronian rocks of Canada and similar rocks in Sweden would seem satisfactory; and, if proven, will be interesting, not only to the geologist, but be of practical value in the search for ores on this coast."

¹⁴ *New York Tribune. October 20, 1891.*

APPENDIX A.

ETHNOLOGICAL COLLECTION OBTAINED AT NORTH-
WEST RIVER AND VICINITY, LABRADOR,
AUGUST AND SEPTEMBER, 1891.

DEPOSITED IN THE NATIONAL MUSEUM, WASHINGTON, D.C.

MONTAGNAIS, OR MOUNTAINEER INDIANS.

- | <i>Museum
Number.</i> | |
|---------------------------|---|
| 153,493. | Prayer Book and Calendar, in native language. |
| 153,494. | Letter on Birch Bark, written by an Indian. |
| 153,495. | Beaming Tool, made from leg-bone of reindeer. |
| 153,496. | Woman's Cap, with bead ornaments. |
| 153,497. | Comb Case (<i>shecowan</i>) and Cleaner (<i>onsnac</i>). |
| 153,498. | Knife (<i>mohentagen</i>). |
| 153,499. | Awl (<i>pesemén</i>). |
| 153,500. | Grainer (<i>mechequat</i>), used in preparing skins. |
| 153,501. | Primitive form of Fish-Hook and Line. |
| 153,502. | Reindeer Sinew used as thread. |
| 153,503. | Woman's Work Bag (<i>menatis</i>), made from leg-
skins of young reindeer. |
| 153,504. | Tool Bag (<i>oshatunas</i>). |
| 153,505. | Wallet for Gun Caps. |
| 153,506-7. | Moccasins. |
| 153,508. | Wallet with bead ornaments, used by women. |
| 153,509. | Snow-Shoes. |
| 153,510. | Conjuror's Drum. |
| 153,511. | Sled or Toboggan. |
| 153,512. | Photographs. |

ESKIMOS—HAMILTON INLET AND VICINITY.

- Museum
Number.*
- 153,513. Woman's Work Bag.
 - 153,514. Dog-Whip, 32½ feet long.
 - 153,515. Native Drawing.
 - 153,516. Boots made of Seal-skin.
 - 153,517. Mitts for feet of sledge dog.
 - 153,518. Woman's Coat of Seal-skin, with fox trimming.
 - 153,519. Mittens, with fox-skin trimming.
 - 153,520-22. Pouches of Seal-skin.

APPENDIX B.

LIST OF PLANTS OBTAINED ON GRAND RIVER
EXPEDITION, AUGUST AND
SEPTEMBER, 1891.

COLLECTED BY PROF. C. A. KENASTON.

Determined by the late Dr. G. Vasey, Department of Agriculture,
Washington, D. C.

[*Plants which have hitherto not been found in any existing catalogue of
Labrador Flora, known to the author, are indicated by an asterisk.*]

RANUNCULACEÆ.

- * *Actæa alba*, Bigel.
- * *Actæa spicata*, L. var. *rubra*, Art.
- * *Aquilegia* (undetermined).

SARRACENIACEÆ.

Sarracenia purpurea, L.

CARYOPHYLLACEÆ.

Arenaria peploides, L.

LEGUMINOSÆ.

Lathyrus maritimus, Bigel.

ROSACEÆ.

- * *Amelanchier*.
- * *Fragaria Virginiana*, Duchesne.
- Potentilla Norvegica*, L.
- Potentilla palustris*, Scop.
- Potentilla tridentata*, Sol.
- Poterium Canadense*, B. & H.
- Prunus Pennsylvanica*, Lf.
- Rubus Chamæmorus*, L.
- Rubus triflorus*, Richard.
- * *Rubus villosus*, Ait.

SAXIFRAGACEÆ.

- * *Ribes rubrum*, L.

ONAGRACEÆ.

Epilobium latifolium, L.

UMBELLIFERÆ.

Heracleum lanatum, Michx.

CORNACEÆ.

Cornus Canadensis, L.

CAPRIFOLIACEÆ.

Linnæa borealis, Gronov.

COMPOSITÆ.

- Achillea Millefolium*, L.
- * *Artemisia Canadensis*, Michx.
- * *Aster acuminatus*, Michx.
- * *Solidago humilis*, Pursh.

ERICACEÆ.

Andromeda polifolia, L.

Chiogenes hispidula, T. & G.

Kalmia angustifolia, L.

Kalmia glauca, Ait.
Ledum latifolium, Art.
Pyrola chlorantha, Swartz.

- * *Pyrola elliptica*, Nutt.
Pyrola secunda, L.
- * *Vaccinium Canadense*, Kalm.
Vaccinium oxycoccus, L.
Vaccinium Vitis, Idæa, L.

GENTIANACEÆ.

Menyanthes trifoliata, L.

POLYGONACEÆ.

- Polygonum viviparum*, L.
- * *Rumex Acetosella*, L.

SCROPHULARIACEÆ.

Castilleia pallida, Kunth, Var. *septentrionalis*, Gray.

SANTALACEÆ.

Commandra livida, Richards.

MYRICACEÆ.

- * *Myrica gale*, L.

BETULACEÆ.

Alnus viridis, D. C.
Betula papyrifera, Mars.

SALICACEÆ.

- * *Salix lucida*, Muhl.

EMPETRACEÆ.

Empetrum nigrum, L.

CONIFERÆ.

Juniperus communis, L.
Juniperus communis, Var. *alpina*, Gand.
Picea alba, Link.

IRIDACEÆ.

Iris Hookeri, Penny.

• RIVER, LABRADOR, 1891.

[illegible]



BULLETIN
OF THE
GEOGRAPHICAL CLUB
OF PHILADELPHIA

VOL. I

DECEMBER-JANUARY, 1894-1895

NO. 3

THE PROGRESS OF DISCOVERY AND THE LANDS
OF PROMISE TO THE EXPLORER.

PROF. ANGELO HEILPRIN.

(Presidential Address, delivered December 5, 1894.)

In reviewing the progress of discovery for the past year it is made manifest to the critical eye that the field of research has not received to it those accessions of knowledge which have made many years brilliant in their achievements. No one single exploration stands out preeminently above any other; there is none that can be said to necessitate in its results any fundamental changes in the map of the globe. Yet it would be erring to believe that geographers have been inactive, or that travelers have thrown off the cloak of their profession. At no previous time, indeed, have geographical societies so completely established their force of existence as at the present, and at no time has their membership, of the great and of the little, been so extensive as it is to-day. But the possibilities of brilliant research are being, year by year, lessened, the continents and oceans have been ruthlessly furrowed by the plough of science, and even into the mysteries of the high atmosphere the hand of the investigator has

been carried very nearly to its fullest capacity. There are still, it is true, areas of vast extent in Africa, in Asia, in Australia, and in America, which are as closely sealed from the eye of knowledge as were the regions to the exploration of which the earlier master-minds of exploration bent their energies; but inferentially it is known that these regions can yield little in comparison to that which, *natura via*, fell to the accident of the early worker. One has but to compare the map of Africa of to-day with that of fifty years ago, to see how pleasantly defaced by lakes, rivers, mountains and settlements is that vast enticing blank which even late into our school-days still bore the designation of the mysterious "Unknown Region." At that time not one of the great equatorial lakes was known. The possibility of the Congo rising not very distant from the headwaters of the Nile was as little dreamed of as the supposition that it might have been only a fork of the Niger, but in place of this knowledge we held the comfortable secret regarding a vast mountain system, the Mountains of the Moon, traversing the continent equatorially from east to west, which, like one of the mountain peaks that recently disappeared from Savoy, remains only a memory. Even great Ethiopia of old has been mercilessly thrown out from the sea of fame, to find a resting-place as a no-clearly defined province north of the equator.

The interest in the work of the year centres mainly around the several expeditions that have again attempted to penetrate the icy seas of the north. At no time during the last quarter of a century has such a determined effort been made to solve the Polar problem and to clear up the mysteries of the Arctic realm. Four expeditions, those of Nansen, Peary, Wellman and Jackson, have been in the field at one time, and to these must be added the co-ordinate expedition, which under the auspices of this Club, was sent out to the relief of the Peary party. At our last meeting we had the pleasure of listening to

the report of its able commander, our honored Secretary, and of welcoming some of the members of the expedition whose return he so successfully accomplished. Through him, too, we heard the evidence which spoke the unmistakable fate which befell the ill-starred Swedish Expedition of 1891. No further effort looking to the relief of the unfortunate Björling and Kalstenius and their comrades of the *Ripple* is necessary; sorrowfully we gazed upon the picture of the staff which marks another resting place in the frozen cemetery of the north.

Of Mr. Peary's failure to accomplish his mission little can and little need be said; it is linked with those undetermined factors of Arctic exploration which have so inscrutably baffled the noblest efforts and assisted the aspirations of others. The unyielding grasp of the severest winter falling with almost unprecedented fury upon a company of men, perhaps not physically equipped for the work of extreme exposure to which they were subjected, reads the brief but painful chapter of history. Let us hope that the year to come may bring success to the resolute Commander, who unbaffled by the strain of hardship and defeat, once more enters the forbidding dark night, bent upon the accomplishment of his mission—the solution of one of the few remaining problems of geographical magnitude.

Less than nine months ago we listened with wrapt attention to the outlines of the two expeditions whose destinations were the antipodal icy zones of the north and of the south—the expeditions of Mr. Wellman and Dr. Cook. Both of these gentlemen have since met with disaster; the crushing of the *Ragnvald Jarl* by the ice of the Spitzbergen Sea and of the sinking of the *Miranda* in the waters off Greenland are a part of the chapter of failure which distinguishes the Arctic work of 1894; to it must be added its saddest leaf, the loss of the good ship *Falcon*, which only recently carried aloft the ensign of the Geographical Club, and bore it triumphantly from the bleak shores of Ellesmere

LEGUMINOSÆ.

Lathyrus maritimus, Bigel.

ROSACEÆ.

- * *Amelanchier*.
- * *Fragaria Virginiana*, Duchesne.
- Potentilla Norvegica*, L.
- Potentilla palustris*, Scop.
- Potentilla tridentata*, Sol.
- Poterium Canadense*, B. & H.
- Prunus Pennsylvanica*, Lf.
- Rubus Chamæmorus*, L.
- Rubus triflorus*, Richard.
- * *Rubus villosus*, Ait.

SAXIFRAGACEÆ.

- * *Ribes rubrum*, L.

ONAGRACEÆ.

Epilobium latifolium, L.

UMBELLIFERÆ.

Heracleum lanatum, Michx.

CORNACEÆ.

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Linnæa borealis, Gronov.

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Kalmia angustifolia, L.

Kalmia glauca, Ait.

Ledum latifolium, Art.

Pyrola chlorantha, Swartz.

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CONIFERÆ.

Juniperus communis, L.

Juniperus communis, Var. *alpina*, Gand.

Picea alba, Link.

IRIDACEÆ.

Iris Hookeri, Penny.

LILIACEÆ.

Clintonia borealis, Raf.

* *Smilacina bifolia*, D. C.

* *Smilacina racemosa*, Desf.

Streptopus roseus, Michx.

JUNCACEÆ.

* *Juncus Balticus*, Dethard.

* *Juncus trifidus*, L.

CYPERACEÆ.

Carex canescens, L., var., *alpicola*, Wahl.

Eriophorum russeolum, Fries.

* *Scirpus sylvaticus*, L.

GRAMINEÆ.

* *Elymus arenarius*, L.

Elymus mollis, Trin.

* *Calamagrostis Canadensis* (Hook.), Beauv.

* *Calamagrostis Langsdorffi*, Trin.

Trisetum subspicatum, Beauv.

EQUISETACEÆ.

Equisetum (undetermined).

FILICES.

* *Aspidium spinulosum*, Swartz.

* *Phegopteris Dryopteris*, Fee.

LYCOPODIACEÆ.

* *Lycopodium annotinum*, L.

* *Lycopodium clavatum*, L.

* *Lycopodium complanatum*, L.

MUSCI.

* *Hypnum Schreberi*.

* *Hypnum Castrensis*.

* *Polytrichum juniperinum*.

LICHENES.

Cladonia rangiferina.

Parmelia (undetermined).

APPENDI

METEOROLOGICAL NOTES, GRAND

Date.	Time.	LOCALITY.	Minimum Temperature for Previous 12 hours.	Maximum Temperature
1891. Aug. 4	8 A.M.	Rabbit Island,	50	
		Mouth of Grand River,	50	
5	8 A.M.	Muskrat Island,	40	
6	8 A.M.	Top of Portage Muskrat Falls,	42	
7	8 A.M.	Top of Portage Muskrat Falls,	55	
7	9 A.M.	River level above Muskrat Falls,	43	
8	8 A.M.	Sandy Bank,	43	
9	8 A.M.	Pinnett's River,	31	
10	8 A.M.	Gull Island Lake,	41	
	6 P.M.	Head of Gull Island Rapids,	41	
11	9 30 A.M.	Head of Gull Island Rapids,	50	
		Bottom of Lower Horseshoe Rapids,	50	
	6 P.M.	Top of Lower Horseshoe Rapids,	50	
12	8 45 A.M.	Top of Lower Horseshoe Rapids,	50	
	6 P.M.	Lower Ninnipi Island,	46	
13	8 A.M.	Lower Ninnipi Island,	46	
	6 P.M.	Ninnipi Rapid,	52	
14	8 A.M.	Ninnipi Rapid,	29	
15	8 A.M.	12 miles above Ninnipi Rapids,	44	
		Slackwater,	44	
	6 P.M.	Slackwater,	39	
16	8 A.M.	Slackwater,	39	
	1 P.M.	Cascade,	50	
	6 P.M.	2 miles above Cascade,	50	
17	8 A.M.	2 miles above Cascade,	50	
	1 P.M.	7 miles above Cascade,	44	
	6 P.M.	Crescent Lake,	44	
18	8 A.M.	Crescent Lake,	44	
		5 miles above Crescent Lake,	35	
	6 P.M.	Trout Point,	35	
19	8 A.M.	Trout Point,	35	
	5 45 P.M.	Mouni Rapids,	30	
20	8 A.M.	Mouni Rapids,	30	
	4 P.M.	Wanakopow Lake,	45	
21	8 A.M.	Wanakopow Lake,	45	
		13 miles from outlet of Lake,	47	
	6 P.M.	18 miles from outlet of Lake,	47	
22	9 A.M.	18 miles from outlet of Lake,	47	
		3 miles above entrance to Lake,	49	
23	8 A.M.	3 miles above entrance to Lake,	36	
24	8 A.M.	3 miles above entrance to Lake,	36	
		8 miles above entrance to Lake,	37	
	5 45 P.M.	10 miles above entrance to Lake,	49	
25	8 A.M.	10 miles above entrance to Lake,	49	
	6 P.M.	21 miles above entrance to Lake,	40	
26	8 A.M.	21 miles above entrance to Lake,	40	
	6 15 P.M.	34 miles above entrance to Lake,	46	
27	8 A.M.	34 miles above entrance to Lake,	46	
	4 P.M.	Base of Big Hill,	46	
28	8 A.M.	Base of Big Hill,	46	
		Top of Big Hill,	46	
		Geoffrey Lake,	46	
29	8 A.M.	Geoffrey Lake,	46	
	5 P.M.	Base of Big Hill,	35	
30	8 A.M.	Base of Big Hill,	35	
		Top of Big Hill,	32	
31	8 A.M.	Geoffrey Lake,	41	
		Fourth Lake,	41	
Sept. 1	8 A.M.	Big Lake,	41	
		Big Lake,	47	
	6 30 P.M.	West end of Big Lake,	47	
2	8 A.M.	10 miles northwest of Big Lake,	47	
	4 P.M.	Top of Grand Falls,	53	
	5 30 P.M.	Base of Grand Falls,	53	
3	8 A.M.	Grand Falls,	53	

BULLETIN
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THE PROGRESS OF DISCOVERY AND THE LANDS
OF PROMISE TO THE EXPLORER.

PROF. ANGELO HEILPRIN.

(Presidential Address, delivered December 5, 1894.)

In reviewing the progress of discovery for the past year it is made manifest to the critical eye that the field of research has not received to it those accessions of knowledge which have made many years brilliant in their achievements. No one single exploration stands out preeminently above any other; there is none that can be said to necessitate in its results any fundamental changes in the map of the globe. Yet it would be erring to believe that geographers have been inactive, or that travelers have thrown off the cloak of their profession. At no previous time, indeed, have geographical societies so completely established their force of existence as at the present, and at no time has their membership, of the great and of the little, been so extensive as it is to-day. But the possibilities of brilliant research are being, year by year, lessened, the continents and oceans have been ruthlessly furrowed by the plough of science, and even into the mysteries of the high atmosphere the hand of the investigator has

been carried very nearly to its fullest capacity. There are still, it is true, areas of vast extent in Africa, in Asia, in Australia, and in America, which are as closely sealed from the eye of knowledge as were the regions to the exploration of which the earlier master-minds of exploration bent their energies; but inferentially it is known that these regions can yield little in comparison to that which, *natura via*, fell to the accident of the early worker. One has but to compare the map of Africa of to-day with that of fifty years ago, to see how pleasantly defaced by lakes, rivers, mountains and settlements is that vast enticing blank which even late into our school-days still bore the designation of the mysterious "Unknown Region." At that time not one of the great equatorial lakes was known. The possibility of the Congo rising not very distant from the headwaters of the Nile was as little dreamed of as the supposition that it might have been only a fork of the Niger, but in place of this knowledge we held the comfortable secret regarding a vast mountain system, the Mountains of the Moon, traversing the continent equatorially from east to west, which, like one of the mountain peaks that recently disappeared from Savoy, remains only a memory. Even great Ethiopia of old has been mercilessly thrown out from the sea of fame, to find a resting-place as a no-clearly defined province north of the equator.

The interest in the work of the year centres mainly around the several expeditions that have again attempted to penetrate the icy seas of the north. At no time during the last quarter of a century has such a determined effort been made to solve the Polar problem and to clear up the mysteries of the Arctic realm. Four expeditions, those of Nansen, Peary, Wellman and Jackson, have been in the field at one time, and to these must be added the co-ordinate expedition, which under the auspices of this Club, was sent out to the relief of the Peary party. At our last meeting we had the pleasure of listening to



The report of its able commander, our honored Secretary, and of welcoming some of the members of the expedition whose return he so successfully accomplished. Through him, too, we heard the evidence which spoke the unmistakable fate which befell the ill-starred Swedish Expedition of 1891. No further effort looking to the relief of the unfortunate Björling and Kalstenius and their comrades of the *Ripple* is necessary; sorrowfully we gazed upon the picture of the staff which marks another resting place in the frozen cemetery of the north.

Of Mr. Peary's failure to accomplish his mission little can and little need be said; it is linked with those undetermined factors of Arctic exploration which have so inscrutably baffled the noblest efforts and assisted the aspirations of others. The unyielding grasp of the severest winter falling with almost unprecedented fury upon a company of men, perhaps not physically equipped for the work of extreme exposure to which they were subjected, reads the brief but painful chapter of history. Let us hope that the year to come may bring success to the resolute Commander, who unbaffled by the strain of hardship and defeat, once more enters the forbidding dark night, bent upon the accomplishment of his mission—the solution of one of the few remaining problems of geographical magnitude.

Less than nine months ago we listened with wrapt attention to the outlines of the two expeditions whose destinations were the antipodal icy zones of the north and of the south—the expeditions of Mr. Wellman and Dr. Cook. Both of these gentlemen have since met with disaster; the crushing of the *Ragnvald Jarl* by the ice of the Spitzbergen Sea and of the sinking of the *Miranda* in the waters off Greenland are a part of the chapter of failure which distinguishes the Arctic work of 1894; to it must be added its saddest leaf, the loss of the good ship *Falcon*, which only recently carried aloft the ensign of the Geographical Club, and bore it triumphantly from the bleak shores of Ellesmere

Land to the gates of our city. Two months have now elapsed since her departure from our port, and no news has been received concerning her or her gallant crew. Seemingly the cargo has been made an offering to the deep sea.

No news has been received from Nansen. Jackson at last accounts was steaming northwards of the 75th parallel of latitude in the direction of his goal—Francis-Joseph Land. With this the record of the Arctic work is practically complete. With all its painful history, the lesson can yet not remain unread how great has been the progress in our mastery of the method of the attack. With three expeditions worsted, one vessel crushed in the ice and a second abandoned to her fate, it is a proud satisfaction to record that these mishaps were unaccompanied by loss of life—a strange, and one might almost say, unbecoming termination to Arctic enterprise.

We cannot allow the icy regions to pass by us without for one moment directing our attention to the antipodal regions of the earth. It is almost exactly twenty years since the first steam vessel, the *Challenger*, passed beyond the Antarctic circle, and from that time until the past year (1893) no other vessel appears to have transgressed that geographical line. In that year, in the month of November and December, respectively, two vessels of a Norwegian fishing fleet, the *Hertha* and the *Jason*, penetrated on the opposite sides of Graham Land to the 68th and 69th parallels of latitude, the highest positions that have heretofore been attained by steam vessels in the Antarctic realm. A number of new lands and islands, to which the names of King Oscar II Land, Weather, Robertson, Christensen and Lindenberg Islands have been given by the commander of the *Jason*, Captain Larsen, were discovered, and the interesting fact brought out that the supposedly continental land-mass of Graham Land is not unlikely an archipelago. Two of these islands, Christensen and Lindenberg, were distinguished by the presence on them of active volcanoes,

the summits of which were found to be partially devoid of snow. In connection with the discovery of new lands in the far south should be mentioned the reported discovery by Captain Johannessen of a new land, now named the Hansenland, lying fifteen miles to the northwestward of the New Siberian Islands, off Siberia, nearly in the course of the drift which was to be taken by Nansen. The new land is described as being ruggedly-barren, almost entirely devoid of vegetation, with high mountains, and supporting gigantic glaciers. It is a little surprising that no previous record has been made of this reported land-mass, and more particularly that Baron Toll, who made such an extensive exploration of the New Siberian Islands themselves, should have been unaware of its existence.

Passing to the work accomplished in more favored lands of the earth's surface, it shall not be my intention to pass in review before you all that has been attempted or even carried through; more, perhaps, to our purpose will be the emphasis of a number of explorations which in one way or another connect with the special interests of a country, or are made noteworthy through particular methods of their own.

Beginning with our own continent, by far the most noteworthy explorations of the year have been those of Messrs. Tyrrell and Low, both of them conducted on British territory. To the former we owe the exploration of a large portion of unknown region lying to the west of Hudson Bay—a region that for at least 600 miles had never been trod by the foot of man before—and the rectification of much of the western contours of the bay itself. Strange that at this late day a journey of this kind in new lands should still be possible within the North American domain; but the northern tundras, or barren grounds, as they are called with us, offer yet more before the history that was begun by Mackenzie, Richardson, Franklin and Back, and continued by Rae, Schwatka and Gilder, shall have been com-

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pleted. A peculiarity of the region traveled over by Tyrrell is its total absence of timber; all the wood that was gathered in the course of this six hundred mile journey, it is said, would not have been sufficient to give the material for a single boot-peg. On the other hand, even in this most treeless area, game of at least one kind is described as being unimaginably abundant. Over an area of three square miles or more, the reindeer were so thick as to almost completely shut out from view the ground.

To Mr. Low belongs the honor of having made the first crossing of Labrador, an undertaking of no narrow calculation. Beginning at Lake Mistassini on the southwest, and terminating at Ungava Bay on the north, Mr. Low crossed the height of land of the region, a rugged and forbidding country, partly timber-covered, and in the main devoid of inhabitants. No specially marked physiographic features were discovered, no great mountain ridges or peaks, and no large streams, but the accessions of general knowledge to a region are always welcome, and particularly so when it is so little known as is Labrador.

The first measurably accurate map of the region was furnished to us by Mr. R. F. Holme in 1888, but that left largely untouched the great interior, with its inter-communicating waterways and scattered lakes, and even to-day, with the additions that have been given to us by Mr. Bryant and by Mr. Cary, we still stand, in the main, only on the outskirts of knowledge.

A third exploration on our continent, less significant, perhaps, than either of the last two referred to, but in one way attaching more to the geography of the home country, is that of the joint Anglo-American Alaska Boundary Commission which has only recently completed its work (of the year 1892). It has been announced, both in the press of this country and in that of England, that as a result of the work of this commission the great colossus of Mount St. Elias, with its 18,000 feet, is removed from the possession of the United States and given over to Great Brit-

ain. This statement is perhaps premature and your President has it from the leader of the United States Expedition of 1891, Mr. I. C. Russell, who, seemingly, first definitely located the position of the mountain, in latitude $60^{\circ} 17' 51''$, west longitude $140^{\circ} 55' 30''$ (the new survey places it in latitude $60^{\circ} 17' 35''$, west longitude $140^{\circ} 55' 47.3''$, or within one-third of a mile of the position determined by Mr. Russell), that no basis exists for the assumed necessary transfer of property. The convention entered into between Great Britain and Russia in 1824, wherein the boundaries of Alaska are assumed to be defined, states that the boundary, after leaving Portland Channel, shall follow the summit of the mountains, situated parallel to the coast as far as the 141st meridian, and thence northward the said meridian shall be the boundary to the Arctic Ocean ; and further, when the mountains above referred to shall be distant more than ten marine leagues from the sea, then a conventional line following the sinuosity of the coast, but never distant from it by more than ten marine leagues, shall be that boundary. Seemingly no mountain axis of the kind referred to exists, and as Mount. St. Elias is less than ten marine leagues from the sea, despite its position east of the 141st meridian, it must, if the facts and conditions are correctly stated, remain a part of the United States. Most of us will probably rejoice at this conclusion and feel proud in the possession of so gigantic a mountain—following within a few feet of the great Star Mountain (the Peak of Orizaba) of Mexico—but the point of the blessing is in a measure removed by the reported discovery that in this very neighborhood of montic agitation, but unquestionably on British soil, two or more other peaks, the most conspicuous of which has been named Mount Logan, exist, whose summits overtop St. Elias by not less than 1000–1200 feet or even more. Let us hope that this may be so. The sublimity of nature is not dependent upon nationality, and whether Mount Logan should prove to be higher or less high than St. Elias, an inheri-

tance of the land whose mountain-climbers have done more to make the world of mountains intimately known than perhaps the people of any other nation, or of the United States, it is certain that like the international peaks of Switzerland it will be honored for its own sake. It behooves geographical societies like our own to study its form and construction and to ascertain its true altitude.

Southward from the United States, in the land of Spanish-America, the year's work has brought out little of special significance. Neither from Mexico nor the States of Central America can much activity in the geographical field be expected. The self-contentment which dominates the life of the people in those tropical regions is a bar to intellectual energy, and what geography still looks forward to for its accomplishment there will probably be left as a task to the traveler of foreign lands. Exploration in the inner wilds of South America, more particularly in the forest fastnesses of the Amazonian basin, where Baron von den Steinen has already reaped such a vast harvest of ethnological facts, continues with a certain amount of rhythmic regularity, but not with that force and vigor which might have been expected from the facilities for reaching the interior which are now offered. With steamboats regularly ascending the Amazons for 2000 miles or more, with similar crafts furrowing the waters of the Orinoco as far as Ciudad Bolivar and beyond, it would seem that even the tourists north would largely follow in the track of the illustrious Humboldt, of von Martius, of Castelnau, and of Bates, Wallace, and Spruce. Is it because these and other streams are now opened to commercial navigation that exploration in the sense that has made these names famous has in a measure ceased? A rich harvest still awaits the scientific traveler in these parts, and to all departments of natural history he could add a storehouse of facts from his researches. Let him not forget that the geography of to-day deals not only with

physiographic and cartographic data, but with the facts of natural history as well—it is the science of the earth and of its inhabitants and productions. With the impetus that has been given to general geological research in the phenomenally growing chief town of the Argentine Republic, La Plata, which to-day after only a few years of existence numbers 60,000 inhabitants and presents a municipal construction of European aspect, it may be reasonably expected that good work in exploration will also before long be undertaken, and much important material will doubtless fall to the first investigator of the inner wall of the Andes. On it may yet be discovered the highest summit of the new world.

Turning our eyes to the Old World we find that the energies of exploration are about equally divided between Asia and Africa, no longer being so completely centred about the Dark Continent as they were to within a few years ago. Little, naturally, can be expected from Europe, where it might almost be said that the country is as well known as are the city walks themselves. Yet, it should not be forgotten that geography to-day means not only a study of the superficial features of the earth's surface, but likewise their interior aspects. The inner field of mountains and lakes offers a profitable field of investigation, and while on æsthetic principles we may deplore the inroads that are being made, and are yet to be made, into the heart of nature's most imposing monuments, the mountains, as geographers we can complacently look upon this work as certain to yield many new and important facts pertaining to their structure. In Germany, France, Switzerland, and Great Britain, the closer investigation of the numerous lake basins is at present attracting considerable attention on the part of geographers.

In the other half of Europe, Asia, the most interesting, if perhaps not the most important work of the year, is the exploration of the Russian travelers, Menkhudjinow and Ulanow, who, disguised as Kalmucks, and thoroughly conversant with the

Mongolian language, succeeded, in a traverse of the entire continent, to enter the forbidden capital of Thibet, Lhasa, which for forty-eight years had been absolutely closed to Europeans, and entry into which had baffled the best energies of many of the foremost explorers. It will be remembered that the Swedish traveler, Sven Hedin, only recently made this effort, but, like his immediate predecessor, Rockhill, failed. What is perhaps most remarkable in the case of the two Russians is that they seemed to accomplish their mission without serious hindrance, and even succeeded in obtaining an audience with the Grand Llama, who presented them with various gifts. The route followed by these worthy travelers on their journey of two years and seven months was from Astrakhan, *via* Lhasa and Kuku-Nor, to Peking.

Joining in interest with this work is the journey of Miss Annie R. Taylor, herself the leader of the expedition, who, with five Asiatics, left Tao-chu, in the province of Kansu, in China (September 2d), also with Lhasa as her objective point. This she succeeded in reaching, but the forbidding gates and ever-watchful dignitaries did not permit her to enter. Miss Taylor's route, which crossed at various points the routes followed by Bower and Rockhill, was one of the most difficult of any leaving the Chinese country, and the success achieved by her is the more remarkable. To Miss Taylor belongs the honor of being the first woman to conduct an expedition into the interior of the "Yellow Continent," although she is not the only one to have crossed it, this mission having also been accomplished by Mrs. St. George Littledale, who accompanied her husband in his venturesome journey.

From a purely scientific aspect the most important explorations that have been made in recent years in Asia are those of Baron Toll, and his associate, Lieutenant Shileiko, who were detailed by the St. Petersburg Academy to investigate a reported mammoth find in the region opposite the North Siberian Islands

and to make a detailed survey of the little-known Anabar tract. The course of exploration covered 3000 miles, extending in various lines from the islands above mentioned far into the trans-Yeniseian region. Of the many new and important facts bearing upon the physical history of the north that were obtained in the course of exploration, perhaps the most significant was the discovery at Buskhaja, on Anabar Bay, in a bed of polished and scratched boulders, of evidences of glaciation, and in the Kotelnyi Island of what is seemingly a portion of the glacial ice itself. Another interesting discovery was the determination that a tree bed—in which complete trees of a species of alder (*Alnus fruticosa*), 15 feet long, with leaves and cones were found—underlies the mammoth layer of Malyi Liahhov, proving that in the mammoth period the limits of tree growth extended full three degrees further to the north than they do to-day. Nearly 2000 miles of this remarkable journey were traversed on reindeer back, 800 of which were directed across the inhospitable and largely swampy Tundras. The extremes of temperature encountered on the journey were measured on an interval of 146° , from 93°F. in July, on the shores of the Arctic Sea, to -53° in November beyond the Khatanga plateau.

We cannot dismiss the continent of Asia without referring to a work, not in the line of exploration itself, but the record of such, only recently completed, which is a living monument to the indomitable pluck and determination of one of that broad school of mountaineers which England has done so much to develop. I refer to the work of Mr. Wm. M. Conway, "Climbing in the Karakoram Himalaya," at once the standard work on Himalayan mountaineering, and the fit companion to the classical works of Whymper upon the Equatorial Andes, and of Meyer upon the Glaciers of Kilima'njaro. Mr. Conway, it is known to possibly most of you present this evening, has made on the Pioneer Peak what is generally considered to be the high-

est authenticated mountain ascent—between 22,700 and 23,000 feet. Whether or not Mr. Graham succeeded a few years before in reaching on the Kabru, in the Sikkhim Himalaya, a somewhat greater elevation, or whether the altitude reached by Graham was to an extent stretched through imperfect barometric measurement, as some skilled mountaineers claim to have been the case, does not affect Mr. Conway's position as a mountain-climber and explorer, as his merit rests not on a single ascent, but upon continuous upland work. Only those who know from personal experiences the hardships of this kind of travel can appreciate the magnitude of the traverse made by Mr. Conway, and they alone are able to measure the significance of the author's epitome of his work : " We spent, in all, eighty-four days on snow or glacier ; we traversed from end to end, for the first time, the three largest-known glaciers [Hispar, Biafo, Baltoro] in the world outside the Polar regions ; and we climbed to the top of a peak approximately 23,000 feet high."

Mr. Conway's experiences, as do those of Graham and Whymper, show all but conclusively that the reaching of the highest summits is a near probability, and your President shares the view of so experienced an Alpinist as Mr. Clinton Dent that it is more a matter of money than anything else. With a well-selected party, and enough of the essentials back of them to ensure comfortable travel, and a balance of time, there seems to be no reason why thousands of feet of vertical ascent should not be added to the record of to-day. At the same time it is well to bear in mind that the actual progress that has been made in high mountaineering in the period of 30-40 years, measured on the vertical scale, is not so marked as some would wish it to be. Ascents are made much more readily, the human frame is seemingly brought in a better condition to the summit—and instruments are accordingly worked with great precision—but the actual amount wrested from the dominion of the skies is com-

Paratively slight. And it may not be uninteresting at this place to briefly summarize the highest ascents that have been made since the year 1855, when the brothers Adolf and Robert Schlagintweit ascended the Ibi Gamin, on the boundary of Gur-whal and Tibet, to what was then the extraordinary elevation of 22,240 feet. Nine years later (1864), Mr. Johnson, one of the aids to Colonel Montgomery, Chief of the Great Trigonometrical Survey of India, surpassed this feat in an ascent of a peak in Ladakh by 60 feet (22,300), and in the following year scaled the peaks E 57 (21,757 feet), E 58 (21,971 feet) and E 61 in the Kuen-Lun, the elevation of the last named being still undetermined, but not impossibly rising to full 23,000 feet. In February, 1883, Güssfeldt reached on Aconcagua an altitude of 21,516 feet and in the same year Mr. Graham made his remarkable mountaineering tour in the Himalaya. It is much to be regretted that this determined Alpinist should not have possessed a more thorough knowledge of the use of instruments than he had, for we should then be in a much more positive position as regards the full extent of his mountaineering exploits. Possibly there is no good reason to doubt the accuracy of his measurements—doubt in the matter being largely the facility, and lack of trouble from the rarefied atmosphere, with which he accomplished his exploits. Assuming the accuracy of his determinations Mr. Graham reached on A 21 (Mt. Monal) an elevation of 22,516 feet, on Jubonu 21,400 feet, on the Dunagiri Range 22,700 feet, and on the Kabru, in the Sikkhim Himalaya, even 24,000 feet. It will thus be seen that the brothers Schlagintweit, forty years ago, carried their standard to a position only a few hundred feet below the highest that has since been attained, but the lack of progress is in itself no indication of the future possibility. Many new mountaineers will, doubtless, warm enthusiastic over Mr. Conway's narrative, and make the effort to break the record—and it will be broken. For a time it seemed, as a result of Mr.

Conway's measurements, that the colossus known as K 2, which has for a number of years ranked as the second highest mountain of the globe, following with 28,278 feet close upon Everest, was to be stripped of its position and relegated to third or fourth rank among the highest summits (27,750). Considerable has been written—some of it, unfortunately, in a controversial spirit—upon the assumed discrepancy in the measurements of height, with a result that Mr. Conway has himself preferred to elect the determination of Colonel Godwin-Austen, and the peak remains as of old the immediate second to Gaurisankar.

Although there has been no very important exploration in Africa since the last crossing by Stanley, it should not be thought that the "Dark Continent" is being neglected by travelers. Day by day our knowledge of this wonderland is accumulating. We have traced the Nile and Congo both to their ultimate sources, the relationships and contours of the great equatorial lakes have been determined, and the snow-fields of Kilima'njaro and Kenia trodden by the foot of skilled Alpinists. Before very long, probably, all the important geographical features of the continent will be made known to us. It is barely thirty years since a young Englishman, Winwood Reade, published a narrative of researches under the title "Savage Africa;" to-day we hear the administrator of the British Central Africa Protectorate, Mr. H. H. Johnson, describing his region as being in considerable part a true Arcadia, "Beautiful in its magnificent blue lakes, its tumultuous cascades and cataracts, its grand mountains, its golden plains and dark green forests," and enjoying, with all, "the exhilarating climate of Northern Europe." Yes, it is from this land of "gloom and savagery," where it had been assumed that the bondage of dark barbarism held control over the destinies of man since he first inhabited the land, that Mr. Bent described those remarkable ruins of Mashona, which have latterly so perplexed archæologists and ethnologists. These are to-day the

Wonder of the Dark Continent, rather than its lakes, rivers, and its deserts.

It has often been brought as a reproach to the work of American explorers that they have contributed so little to the knowledge of the African Continent, and it is true that if we exclude the names of Stanley and DuChaillu, both of whom may question the status of their nationality, the African page bears but a meagre American inscription; it is doubly to be regretted, therefore, that the expedition of Mr. Chanler, of New York, which started out under such favorable auspices, and hoped to clear up some of the mysteries which still shroud the East equatorial region, should have met with disaster and come to such an untimely termination. Abandoned by his native attendants, he has been obliged to follow and to return in the footprints of his companion, Lieutenant Höhnel, who was early incapacitated from service by the charge of an unrespecting rhinoceros.

Even less fortunate has been Count Ruspoli, the leader of another small party of exploration to East Central Africa, whose death some accounts place to the conscience of an infuriated elephant. To this chapter of disaster must be added another, news of which has barely had time to reach us—the massacre of Kretschmar and Lent, commanders of a scientific expedition to Kilima'njaro, by the warriors of an inhospitably-inclined tribe of natives. It is to be hoped that a better fate will reward the labors of Mr. Scott Elliot around and about Ruvenzori, that grand snow-capped mountain which has been unveiled by Stanley and to-day made to do duty as the representative of the fabled "Mountains of the Moon."

From the great west centre of the African continent news of disaster and victory, largely coupled with the interests of territorial aggrandizement and colonization, rather than with exploration, follows in rapid succession; the massacre of the French column at Timbuctoo, whither it is hoped to construct a Trans-

Saharan railway, may for awhile delay the project, but it is sure to be realized before many years have passed. Indeed, the project of the construction of a railroad across the entire north and south extent of the continent is already "in the air"—an undertaking which, if carried out, would even far surpass the great Trans-Siberian Railway, now in actual construction, and whose completion over a linear extent of 4000 miles (apart from its Russian connection) is confidently looked forward to as a milestone in the progress of the next decade.

From the point of view of the general geographer, whose scope takes in not only the superficial aspects of a country, but its physical construction as well, perhaps the most interesting contribution to African knowledge that has been made within late years is the demonstration by Dr. J. W. Gregory, of the British Museum, that there exists in Eastern Africa, occupying a very considerable portion of its extent, a narrow, and in places a very deep trough, in which the great lakes and many of their tributaries are located, and which, with a more or less open and depressed lowland, communicates with the basin of the Red Sea, and yet further with the Dead Sea and to the Valley of the Jordan. To use Dr. Gregory's own words: "From Lebanon, then almost to the Cape there runs a deep and comparatively narrow valley, margined by almost vertical sides, and occupied either by the sea, by salt steppes and old lake basins, and by a series of over twenty lakes, of which only one has an outlet to the sea. This is a condition of things absolutely unlike anything on the surface of the earth." The presence of such a rift, for rift it appears to be, can only be compared with the long lunar rifts which have so long puzzled astronomers. To Professor Suess, the eminent geologist of Vienna, we owe, indeed, the first demonstration that over large areas of the earth's surface the crust has been steadily breaking through in the direction of the earth's centre, and that the crust has been torn and rifted throughout all

time by the subsidences of earth blocks; and he truly, many years ago, pointed out the probable existence of this vast Afro-Asiatic trough, the evidence to which has now been supplied by Dr. Gregory. This investigator was actually able to trace a long parallel-sided and steeply-walled valley, of perhaps twenty to twenty-five miles width, extending southward from the Great Nyanza to beyond the first parallel of south latitude, or over a linear distance of some 150 miles or more. Over much of this extent the boundary-walls are described as being "so precipitous that not even the most expert of cragsmen could scale them;" sheer precipices are indicated with elevations of 800 and 1000 feet. This remarkable structure of most unique development and extraordinary persistency must be regarded as one of the most interesting features of the earth's surface.

Leaving the field of past exploration for that which yet remains to be accomplished, I shall not occupy your time with a recital of all that still remains the task of the explorer. Room for work there is yet in almost every corner of the globe, and it would perhaps be a false distinction to say that the special fields which I desire to emphasize are more important than many others. But at the present moment they appeal to me with particular force, and perhaps because I am a student of natural science as well as of geography, their importance suggests itself to me in a way that might not impress the simple geographer. First in the line—always barring those seemingly impregnable fortresses of the antipodal north and south, the Arctic and Antarctic regions, the interest attaching to the exploration of which is so well known as to require no further emphasizing—I would suggest a thorough exploration of the Inter-Continental tract which on the North Pacific unites North America with Asia—the Aleutian Islands and Peninsula, the Behring Sea and Strait, and the Peninsula of Kamtchatka. Where two continents approach one another so closely and give evidence of having been united

at seemingly no very ancient date; where a connecting land-bridge could not but most effectually influence the distribution of life, human, animal, and vegetable, upon two hemispheres—there, manifestly, the harvest of exploration must be great, for bound in with the research are problems of deep significance, touching alike the sciences of geology or physical geography, ethnology, geology and botany. We ask ourselves the questions: If North America and Asia were united, when and how did the separation take place? What heterostatic condition existing between the land and the water permitted of the incursion of the sea or the dropping of the land? To what extent was the union complete, and what were the initiatory steps that prefaced the fall? What were the nature and extent of the animal and vegetable migrations of which the connecting land-mass permitted, and which way did they influence the present distribution of life upon the globe? In what way was the distribution of races effected or determined by that connecting bridge? Plainly enough the breadth of these questions indicates how vast is the field that is to be covered by the answer; and while it may be difficult to obtain these answers, they are surely locked up with the rocks that form the continental border-lands, the islands that dot the sea, and the submerged bottom-land of the ocean. And when they will have been obtained they will constitute some of the worthiest contributions to geographical science the records of which adorn the pages of discovery. It is almost incredible that with so much promise in the exploration of this region so little should have been accomplished. Easy of access, and well within the resource of a moderately-equipped expedition, the region should long since have attracted to it an army of scientists, but for the moment Dr. George Dawson is almost the only one who has contributed to our knowledge on the lines of the inquiry which I have outlined. Unfortunately, as a member of the Behring Sea Commission, his explorations were largely con-

trolled by matters of national import, and were not permitted that scope which the interests of science demand. Yet the simple discovery by him of a mammoth tooth on one of the outlying islands is in itself an index pointing hard-by to the history that is still to be read in the broken fragments of the northern waters.

The second region to which I should direct exploration is West Central Africa—the region of the equatorial forests, whose sombre depths, perhaps shaded by many of the same trees which already threw out their arms in the days of Herodotus, still await the traveler of the pattern of Emin, Holub and Schweinfurth, to whom exploration meant not merely the following and plotting of river-courses, the determination of astronomical positions and the laying of a route, but the close investigation of all nature, from its rocks, and plants, and animals to man and the atmosphere. For such a one this region is as yet a world unconquered.

The line of investigation which I should here specially recommend is one looking to the history of man and his nearest associates, the anthropoid apes, for after all the history of ourselves appeals with more force to almost every form of intellect than probably any other inquiry. And I specially emphasize in this connection the West African region because I believe that there, under competent search, will be revealed some of the most interesting, if not the most ancient records that pertain to hominine history. For we cannot lose sight of the fact, that in whatever manner we may view the evolutionary doctrine so far as the direct ancestors of man are concerned, his nearest analogues are the great apes of this region, and from their habits and customs much can be learned. But I wish specially to emphasize the necessity for searching for their predecessors; the rocks of the region, so far as our knowledge is concerned, are yet silent on this point, but remain silent only because no real effort has been made to search their records. It has been the fashion of late years for

geologists and naturalists to consider the African fauna as an importation from Europe—the element of the northern continent driven south by the cold of the Glacial epoch, and crossing over into the southern continent at a time when one or more land-bridges spanned what is now the Mediterranean. There is much to support this view, perhaps equally much that is against it, but in whatever way the evidence lies it never will be complete until the rocks of Africa are searched for possible ancestors or progenitors of the existing fauna. Until they are discovered, or their existence virtually disproved, the question of origination will be an open one, and in so far will the history of the anthropoid apes, and I venture to say with them, the history of man, be debatable.

Much interest has been reawakened of late years in this West African region through the rediscovery, in various parts of it, of those diminutive people to which DuChaillu first called serious attention the better part of a half a century ago. At that time there were comparatively few who were prepared to believe that the pygmies of Herodotus were actually living, and the young traveler who first reported the facts was subjected to much adverse criticism on the part of those who professed to know more of the African continent from the outside than did the travelers from the inside. The Obongos of to-day, as they are described by M. Dybowski, are essentially the same as they were in Du Chaillu's time, and probably differ little from the forest children which Stanley has made known to us, and from the Akkas of Schweinfurth. In stature they are among the most diminutive of all the peoples of whom we have knowledge, the men measuring but little over four and a half feet in height. At the present time they are found only in scattered numbers, and seemingly the tribe is on the verge of extinction.

The third field of geographical exploration which to your President appeals with special force is one that conducts beneath the earth's surface, and would by the geologist be considered to

lie within his own domain. But the problem which it touches is geographical as well as geological, and in it not impossibly will be found the answer to that vague hypothesis of an Atlantis, which for nearly two thousand years, or more, has presented itself to us in both scientific and unscientific form. The Darwinian theory of coral islands, which presupposes vast subsidences over the earth's surface—subsidences that are almost coextensive with the expanse of our oceanic basins—still awaits a final verdict from the practical side of proof; and only when deep borings will have been made in coral islands will this proof be accessible. It is the province of geography to determine upon what form of structure—whether a volcanic peak, a mountain range, or the summit of some subsided continental area—the many coral islands that dot the sea are implanted. The zoologist has given to us the conditions under which the coral animals construct their reef-habitations; it is now for the geographer to supply the terrestrial or oceanic configuration which meets these conditions. The Bermuda Islands offer a specially desirable field for this form of inquiry. Distant upwards of 600 miles from the nearest shore line—with the exception of the Sandwich Islands the most distinctively oceanic of all oceanic islands—and so far as is known independent in their existence of all volcanic associations, they seem particularly adapted to throw light on the problem of past changes in the land and water areas of the globe. A boring of a few hundred feet—possibly even a single hundred—would determine the substratum of the islands, and inform us whether we are dealing with a simple oceanic volcano, or with the submerged summits of a mountain axis whose base is implanted upon the oceanic floor. If the latter should prove to be the case, then after all we may not be far removed from the gates of the veritable Atlantis. Many facts in geology and in the distribution of animal life to-day favor the view of a comparatively recent (geologically speaking) land-mass connecting Western Africa

with the ancient Spanish Main, and it would certainly be interesting to throw additional light upon this subject from the side of geography. The investment of a few thousand dollars could not be more profitably placed than in the effort to determine what is within the land that is covered by the sea.

A fourth field of exploration, which holds out rich reward to the all-round investigator, is the extreme south of the South American continent and the islands and land-mass that more or less project it in the direction of the Antarctic continent. In the exploration of this region we open up much the same problems as those that are presented by the North-Pacific—namely, the problems of continental relationships and breakages. What is the relationship of South America with the Antarctic continent? Whence has it obtained its fauna and flora? Who are the far southern people? These are but a few of the questions to which neither the geographer nor the scientist is ashamed to receive an answer. It is gratifying to be able to state in this connection that, in England at least, the revival of Antarctic exploration is being warmly agitated, and unless the signs entirely fail us, we may expect before long a well-equipped expedition to the region which for a half century, or since the days of Sir James Clark Ross and Wilkes, has remained a blank upon the calendar of geographical research. What may or may not be obtained in the far south cannot be foretold; our present knowledge of the region dates from a time when the possibilities of conducting research in the Antarctic realm were exceedingly meagre, and when the enthusiasm that is begotten of successful research had not yet developed.

With these few fragmental statements, ladies and gentlemen, I close my address, venturing the hope that our association will always keep friendly to exploration, encourage it from all sides, and desist only when the methods that have been selected for its accomplishment are considered unworthy or unsatisfactory.

NOTES.

The Culminating Point of the North American Continent (p. 91). The position of Mt. Logan is Lat. $60^{\circ} 34' 1''$, W. Long. $140^{\circ} 23' 49''$, or twenty-six miles to the northeast of Mt. St. Elias; its altitude is given as 19,514 feet. It is an interesting circumstance that the very great height of this mountain was not discovered in the field, but in the operation, as it has been stated, "of browsing around in a table of logarithms." It is a question to what extent this determination can be accepted as being reliable. The points of measurement were seemingly only two, one on the northern side of Yakutat Bay, near Point Manby, and the other at the southeastern entrance to that bay, at Ocean Cape. The distance from either of these two points to Mt. Logan is not more than thirteen miles in excess of that, measured from the same points, to Mt. St. Elias, and any trained eye would readily have detected a difference of 1500 feet in favor of the more distant mountain. The difference was in fact, however, greater, since Mr. Russell states that these "giant peaks not before seen," only "*seem to rival* in height St. Elias itself" [the italics are my own; see Bull. Am. Geogr. Soc., March, 1894, pp. 102, 103]. It seems hardly possible that a surveying party of skilled men, having in charge the determination of height of what had for a long time been considered to be the culminating point of the North American continent, should not have made a special effort to ascertain the height of a closely-neighboring mountain whose elevation gave any suspicion of being a rival, and the suspicion in the case of a summit now assumed to overtop the other by 1500 feet ought to have been a very great one.

There is hardly room for doubt that the latest measurements of St. Elias, giving to the mountain an elevation of 18,015 feet, are closely exact; the mountain then falls some 200 feet or more below the Peak of Orizaba (Citlaltepetl), in Mexico. In

October, 1890, in a paper entitled "Barometric Observations among the High Volcanoes of Mexico, with a Consideration of the Culminating Point of the North American Continent" (Proc. Acad. Nat. Sciences of Philadelphia), I announced the fact that the Peak of Orizaba, and not Popocatepetl, was the highest summit of Mexico, and that its true height, as my measurements made it, was approximately 18,205 feet. I then also stated, in reviewing the measurements that had heretofore been made of St. Elias, that the question of absolute height (of the Alaskan summit) was still an open one, and further: "That the mountain closely approximates the giants of the Mexican plateau is almost certain, but it seems equally probable that its true position is after, and not before, the Peak of Orizaba." Both of my conclusions have since been confirmed. Mr. J. T. Scovell, of Terre Haute, Ind., obtained in 1891, as the result of two measurements with an aneroid barometer, an elevation for the Peak of Orizaba of 18,179 feet (mean), and in the following year, with angle measurements taken from a base of 13,000 feet height, 18,314 feet—a general result, as Mr. Scovell says, "surprisingly near that of Professor Heilprin" (*Amer. Naturalist*, October, 1892). The height now generally accepted for Orizaba is the angle measurement of Scovell, of 18,314 feet. A reference to his paper shows that he assumed for the starting point of his measurement, Chalchicomula, an elevation above the sea of 8313.5 feet. From the data furnished to me by the officers of the Mexican Railway I had assumed for this town an elevation of approximately 8200 feet, the position of San Andres being only 7974 feet. It may well be that the data obtained by Mr. Scovell for the elevation of Chalchicomula are more accurate than my own, but if we deduct a possible excess of 113 feet from his measurement it would bring the mountain to 18,201 feet, or actually to within four feet of my own determination. Singularly enough, the Mexican Sci-

entific Commission of 1877 placed the elevation of Chalchicomula at 8452.6 feet!

The barometric (mercurial) measurements of Dr. Kaska (1889?), which gave to the mountain 5550 metres, or 18,206 feet; my own (aneroid), which gave 18,205 feet, and those of Mr. Scovell (aneroid), which gave in one instance 18,219 feet, and in the other, 18,139 feet, show very clearly the precision that may be arrived at with the barometric method. In Petermann's *Mitteilungen* for November, 1890 (p. 280), my measurements are received as definitely proving Orizaba to be the highest summit of the Mexican Republic; in the same journal for April, 1891 (p. 104), a caution is thrown out as to the acceptance of my results because the writer, Herr Wichmann, is informed by Professor Hann, that my determination was obtained by a single reading of the aneroid, the correction for which had not been obtained. This is followed by the rather remarkable statement: "It is almost incomprehensible that Heilprin did not avail himself of the opportunity to obtain the correction for his instrument in the Meteorological Observatory of the City of Mexico before and after each mountain ascent." Considering that in my paper above referred to I distinctly state that my instrument was "corrected at Philadelphia . . . at the sea-level of Vera Cruz, and in the Central Meteorological Observatory of the City of Mexico," and that "to the officers of the latter institution I am indebted for the privilege of making comparisons with the standard mercurial column," this criticism on the part of the German geographers is incomprehensible; and no more comprehensible is it when we read in the 1890 number of the *Mitteilungen* that my determinations were carefully made with an aneroid whose correction had been obtained at the Mexican Observatory! In the *Mitteilungen* for January, 1892 (p. 21), in a note to an article by Professor Lindenkohl on the position and height of St. Elias, the editor, Dr. Supan, again calls attention to the unreliability (un-

verlässig) of my measurements, and still later, June, 1893 (p. 143), after my determinations had been fully confirmed by Scovell, returns once more to the subject, and says (in a note) that the correspondence between my results and those of Scovell *need not be more than a mere coincidence* (*Die Uebereinstimmung kann aber auch nur eine zufällige sein*), since, "while we are informed that the instrument had been proved in Philadelphia and the City of Mexico, we yet do not know if a proper correction was determined for low atmospheric pressures" (translated from the German)! We may well wonder what kind of a coincidence this could have been, seeing that the same barometer brought the height of Popocatepetl (15,723 feet) to within 67 feet of Humboldt's measurements (corrected to the true level of the City of Mexico) by triangulation, the Nevado de Toluca (14,954 feet) to within 84 feet of Humboldt's determination, and Ixtaccihuatl (16,960 \pm feet) to within about 10 feet of Sonntag's figure. This coincidence with the result obtained by Sonntag, of whose work I was entirely ignorant until my return to Philadelphia, is the more significant as my measurement made the mountain 1258 feet higher than it was assumed to be by Humboldt, and very nearly 900 feet higher than the figures given by Garcia Cubas and Alberto Carrea. That Sonntag's determination is approximately the correct one will be apparent to any one who looks at the two mountains with a critical eye; and I have since proved the correctness of my relative result by means of photographic measurement—the comparison of heights of the two mountains on a single photographic horizon, the mountains being taken from the same position in Puebla.

There has been much written of recent years about the superiority of the trigonometric measurement as compared with the barometric, but I am not sure that if the actual facts were brought together they would sustain this position. If the angle measurement is so reliable what accounts for the vast differences in

the results that are so often obtained? Let us take such a mountain as St. Elias, for example. We have the measurement of La Pérouse, in 1786, which gave less than 13,000 feet; of Malespina, in 1791, which gave 17,851 feet; of Dall, in 1874, of 18,033, 18,350, 19,464, and 19,956 feet; of Russell and Ker, in 1890, of 15,000 feet; and finally of Russell, in 1891, of 18,015 feet. It is true that Dall had seen reason to reject all his measurements except the one obtained from Port Mulgrave, 19,464 feet, and in reply to my criticism defends (*Science* for 1891) his position, and assumes the probable correctness of this measurement. And now we have what is seemingly a final determination of 18,015 feet. A similar instance of discrepancies is presented by Mt. Fairweather, where Mr. Dall's measurements brought 15,085, 15,247 and 16,009 feet. Then, again, we have Ixtaccihuatl, with Humboldt's determination of 15,702 feet, and Sonntag's of 17,076 (properly 16,951 feet); and Orizaba, with Humboldt's measurement of 17,375 feet; Ferrer (1796), 17,879 feet; Plowes, Rodriguez and Vigil (1877), 17,664 feet; Müller (on the authority of Grisebach, *Vegetation der Erde*, 2d. ed., II, p. 563, 1884), 18,112 feet, and Scovell, 18,314 feet. The height of Aconcagua, as is well known, flits between the measurements of Fitz-Roy, 23,910 feet, and those of Pissis, 22,422 feet. A very large number of non-concordant mountain heights might be instanced, but to no special purpose. The chance of the personal error, especially in the case of high mountains deeply buried in snow, where there is considerable light aberration, is by no means small, and it is, therefore, no proof of the correctness of a measurement if the same observer obtains a number of results which are closely corroborative of one another. That small angles of measurement are unreliable is indisputable, and the same can be said of the determinations made by those who are not well familiar with the use of instruments.

America has been singularly unfortunate in the instability

of its mountain heights. Some years since when Mt. Hood, in Oregon, was rapidly declining from 16,000 feet to somewhat over 11,000 feet, the most that Major Williamson would allow for it, it was satirically stated that with a few more years of grace the mountain would be transformed into a hole in the ground. At this writing the intelligence is brought that Mt. Brown, in British America, which has proudly figured on many or most modern maps with the very respectable elevation of 16,000 feet, has ignominiously fallen to about 9000 feet (Professor Coleman, in an account of the ascent of the mountain, *London Geographical Journal*, January, 1895).

Arctic Temperatures (p. 87). Not impossibly the weather encountered by Mr. Peary was the severest experienced by any Arctic expedition. The start for the inland ice was made on March 6th, or but shortly after the return of the first sun, and for the greater part of the six weeks during which this journey was continued the thermometer kept well between the -30 and -50 degree marks. On March 24 (23 ?) the thermometer descended to -60° F.; for thirty-four hours about this time the average wind velocity was over forty-eight miles per hour. Mr. Peary thus writes : " When these figures are considered in connection with our elevation of some 5000 feet, the unobstructed sweep of the wind, and the well-known fact that ice-cap temperatures accompanied by wind are much more trying to animal life than the same temperatures at sea-level, it is believed that the judgment will be that this storm beat the record as the most severe ever experienced by an Arctic party." It is interesting to note in this connection that Kane recorded a temperature of -69° , and the British Polar Expedition of 1875-76 a minimum (March) of -73° . This is still considerably below the lowest reading of the mercury ; at Verkchojansk, in Siberia (Lat. 67° , or just beyond the Arctic Circle) a minimum of -81° F. has been recorded, and even at Yakutsk, which is situated considerably south of the

Arctic Circle, a temperature of -79° has been noted. It is, however, well possible that even this is not the lowest natural cold that is known; Signor A. Mosso, in the Bulletin of the Italian Alpine Club (year 1893), notes that in February, 1892, at a locality in Eastern Siberia south of the 67th parallel of latitude, the mercury dropped to -69.8° C. (-93° F.)! It is a suggestive comparison that the lowest mountain temperature hitherto recorded is -40° C. (-40° F.)—registered on the summit of Mt. Ararat (elevation 16,115 feet) on maxima and minima thermometers left there by Pastukof in 1892, and recovered on the 26th of August following by M. Zimmer (communication addressed to the Académie des Sciences of Paris by General Venukof).

The Spitzbergen Route and the Passage of Melville Bay (p. 87).

The failure of the Wellman Expedition, which was planned to penetrate to the far north by way of the Spitzbergen Sea, is much to be regretted, especially as it was brought about by a condition—the crushing of the “base” or “supply” ship, the *Ragnvald Jarl*—for which the commander was hardly responsible. In my booklet on “The Arctic Problem” (1893), I ventured the assertion that the Spitzbergen Sea route is really the most available route for reaching the Pole, and it would seem, as I learned through conversation with Mr. Wellman, that it was this decision which largely influenced him in the selection of his route. In a measure, therefore, I am, perhaps, responsible for this failure. But I think that Mr. Wellman has well demonstrated the possibilities of this route. The fact that he was able to reach Dane’s Island, in Lat. $79^{\circ} 55'$ north, as early as May 7th, and to penetrate to within a few miles of the 81st parallel—(by open water, 150 miles northeast of Dane’s Island) by May 12th—speaks for itself as a factor in favor of this route. On the other hand, the exceedingly rough condition of the sea-ice, which prevented for days an accomplishment of more than a mile per day, was an obstacle that could not readily have been overcome, and mani-

festly, even had the *Ragnvald Jarl* not been crushed, and a return of the commander to the scene of the disaster necessitated, the journey could not have been a protracted one. A much superior effort could, doubtless, have been made in a more auspicious season, and it should be a canon in Arctic exploration to attempt nothing "big" when the elements are plainly visible to be adverse at the very start.

In this connection it is interesting to note the certainties which to-day associate themselves with some parts of Arctic exploration. I refer here to the passage of Melville Bay. For a long time this water, by reason of its vast floes and giant icebergs, was considered to be one of the most dangerous of the Arctic realm, although an examination of the literature of northern explorations shows few accidents to have occurred here, even if there have been a number of detentions. The vessels of the whaling fleets are frequently caught up, but their passage is an early one, and one conducted without any real regard for safety. The events of the last few years would seem to indicate that, in average years, a period of at least 6-8 weeks, or from the last week in July until the first week in September, can be safely relied upon to give an almost unhindered passage; indeed, almost the very day of the opening of the ice can be predicated. In the Peary Expedition of 1891 the *Kite*, after being imprisoned in the ice for just three weeks, gained the open water off Cape York on July 23d; in the following year the same vessel of the Peary Relief Expedition reached the identical spot on exactly the same day, and this was repeated in 1894 by the *Falcon*, the vessel of the Peary Auxiliary Expedition. At these times, while a certain amount of butting was still necessary, the ice was not sufficiently heavy to materially interfere with navigation. Mr. Peary's remarkable passage, in the *Falcon*, in 1893, is the quickest on record; leaving the Duck Islands at 4.40 P. M. of July 31st, the point of Cape York was reached at 5.30 P. M. of the

following day, allowing for the passage only 24 hours and 50 minutes.

The Ancestry of Man (p. 103). As this is going through the press the writer has received, through the kindness of its author, the elaborate memoir of Dr. Eugene Dubois, of the Dutch East Indian Army, on the remains of a preeminently hominine anthropoid which were recently discovered in the Post-Pliocene or Pliocene deposits of the Island of Java. If the premises in the case have been well taken—and there is no special reason to doubt that they were—then seemingly in this discovery we have the actual substance of the "missing link" itself. The remains in question consist of the roof of the skull, the femur, and a molar tooth of a mammalian which was of approximately the size of man, but whose affinities were largely with the apes, as is proved by the general cranial conformation and by certain simian characteristics of the thigh-bone. On the other hand, the cranial arch is surprisingly pronounced, falling almost half-way between that of the chimpanzee and that of man, while the cranial capacity actually approaches the "physiological minimum" in man, and is double that of the gorilla! The thigh-bone is in form and dimensions the absolute analogue of that of man, and, in the opinion of the author, gives unmistakable evidence of having supported an habitually erect body. To this remarkable "man-like transition form" (*menschenähnliche Uebergangsform*) Dr. Dubois gives the name of *Pithecanthropus erectus*, using the generic designation which Professor Haeckel applied in 1868 to a hypothetical form to be discovered, and which now comes in with special appropriateness. The nearest ally to *Pithecanthropus* appears to have been the large chimpanzoid *Anthropopithecus Sivalensis*, from the Siwalik deposits of India, which, indeed, may be ancestral to this newly-discovered form and to the African chimpanzee as well. Dr. Dubois unhesitatingly places the extinct Javan ape as the intermediate form between man and the

true anthropoid apes, and the order of development (evolution) which he assumes to have been most likely is: *Prothylobates*, *Anthropopithecus Sivalensis*, *Pithecanthropus erectus*, *Homo sapiens*. This view is largely at variance with that held by some of the American paleontologists, who look to a more direct lemurine ancestry for man.

It may, of course, be that the remains in question are merely a physiological abnormality—and it may also be that the femoral bones do not belong to the same individual to which the head-pieces belong, but there is seemingly no reason for assuming either of these conditions. The region in which they were discovered is one in which a more progressive ape (or ape-like form) than any with which we are now acquainted might very well have lived, and, indeed, it would be a little strange if forms somewhat like the gibbon or the orang should not be discovered in the younger deposits of this anthrozoal region.

African Pygmies (p. 104). Three members of this tribe of the Obongos were measured by Dybowski, and their individual heights were found to be 4 feet 6 inches, 4 feet 7 $\frac{1}{4}$ and 4 feet 7 $\frac{3}{4}$ inches respectively. They all possessed great muscular strength, and a remarkable amount of endurance. In general appearance they differed essentially from the typical African or negro in the globular head, comparatively thin lips, compressed noses, and the general light coloring of the visual organs and their surroundings. Eyebrows and eyelashes are both fair, and the eyes themselves have nothing of that intensity which distinguishes the eyes of most negroes. No extra-African people approach the Obongos in diminutive stature. It is a common notion that the Eskimos are a people of dwarfs, and there are not a few even among geographers and anthropologists who class them as such. This, however, is in reality not the case, for while it is perfectly true that grown men and women are frequently met with whose statures only exceed by a few inches those of the Obongos, there

are others of the same tribe who would not stand back in comparison with some of the white races. In the course of my study of these people in northern Greenland I obtained measurements, and not exceptional ones, of men of 5 feet 4, 6 and 8 inches, with a range extending to quite 6 feet. The women are considerably smaller, and I am not certain if I met with any whose height exceeded 5 feet 3 or 4 inches. On the other hand there were some whose height did not exceed 4 feet 6 inches.

Southern Continental Connections (p. 106). The view that has been held by many naturalists, notably Hooker, Darwin, Wallace and Blanford, that there was a former land extension in the Antarctic or sub-Antarctic tract which brought many of the (now) disjointed or separated southern regions into union with one another, and permitted of a commingling of their respective faunas or direct migrations from one point to another, has recently received strong support from Prof. H. O. Forbes, who specially emphasizes the discovery in the Chatham Islands, lying off New Zealand, of a large coot (*Fulica*) and of a giant wood-hen (*Aphanapteryx*), which had heretofore been known only from the Mauritius, or from a region removed by nearly half the circumference of the globe. It is naturally assumed that these birds must have had a common origin, and that their present disjointed distribution is due to a separation of the land-areas over which they effected their first migration. While the evidence is as yet far from conclusive as to the correctness of the position here held, it may still be assumed without doing violence to any known facts, that such a united main in the south may have existed; indeed, there is hardly room for doubt that it did exist, and not impossibly the connection extended quite to the region which is to-day perpetually buried beneath the great southern ice-cap. Again, there are many facts that point to the conclusion that a considerable portion of what is now the southern fauna found its way by distribution northward, rather than in

the opposite direction, as is held, perhaps, by the majority of naturalists.

The Origin of Lake Basins (p. 93). It is earnestly to be hoped that these new studies of lakes will cover also the formation of their basins, and determine once for all their relations to glacial scour. However opposed geologists may be to the view which holds that the numerous rock-basins of the north have been excavated by ice action, the fact of the remarkable association of such basins with regions of past glaciation cannot escape the unprejudiced eye and mind, and some explanation of this association should be forthcoming. I confess that to me the arguments, derived from practical experience and personal knowledge, which have been adduced by Mr. Douglas Freshfield and Professor Bonney as against the possibility of glacial scour—*i. e.*, that glaciers are rather protectors of terrains, and that a careful and protracted examination of Swiss glaciers failed to show a single glacier doing the work of excavation—appeared to me quite satisfactory for the negative side of the argument up to the time of my recent visits to Greenland, where the character of the landscape immediately impressed me with a true glacial effect, and convinced me that the scouring and eroding power of glacial ice was very much greater than the geologists of the "opposition school" were prepared to admit. In reviewing the entire subject it has appeared to me that the only forcible argument which has been advanced against glacial scour is that of Freshfield and Bonney, but I think that a simple mathematical demonstration will immediately show the weakness of this argument, if not completely destroy it. Indeed, Mr. Wallace (in a series of papers published in the *Fortnightly Review*) has already met the deficiency of ocular demonstration by assuming that, with a long duration (thirty thousand years) of the Ice Age, the rate of erosion need not have been more than an inch a year to account for the shaping of lake-hollows of 2500 feet depth, such as we find in the

deepest of the Italian lakes (Laggo Maggiore). Of course, no such minimum scour could ordinarily be detected in a glacier. But the amount of scour could readily be increased ten times, or even twenty times—to ten or twenty inches annually—and still nothing would be made apparent to the ordinarily observing eye, since, even if we assume the working power of a glacier to be restricted to six months of the year, the daily excavation would be so slight (at the utmost one-ninth of an inch; the 1-200 inch per hour!) as entirely to escape attention. And were we even to reduce the duration of the Glacial Period to one thousand years, this minute, invisible work could still account for the depths of nearly all known lakes. The comparative study of the contours and bottoms of assumed glacial and non-glacial lakes can alone give the solution to the general question.

The Subsidence Theory of Coral Growth (p. 105). The cost of a deep boring would probably not exceed on an average three or four dollars per foot.—It is difficult to understand the attitude of English naturalists toward the subsidence theory of coral reefs. There seems to be such an aversion to it at this time that apparently any fact that might be brought up in its favor would be construed as pointing directly to the contrary. The most recent anti-Darwinian contribution on this subject is contained in the reports of explorations of the famous Macclesfield Bank, situated in the middle of the China Sea, which served as a text to Mr. Darwin in the discussion of drowned atolls. I have not Mr. Bassett-Smith's final report with me, but from a review of this report by the well-known geographer, Hugh Robert Mill (*Nature*, Dec. 27, 1894), we learn that this bank is of oval shape, about 80 miles in length and 30 miles wide, with a general depth of 40 fathoms. The whole circumference of the bank is elevated as a ring of coral to within from 9 to 15 fathoms of the surface, and is "broken here and there by wide gaps of greater depth,

but never so deep as the central depression, which varied generally from 40 to 48 fathoms." All these conditions conform strictly to the atoll structure and gave to Mr. Darwin the impression, from the depth at which the bank is placed, that the region had been depressed through subsidence.

The very important discovery by Mr. Bassett-Smith of patches of reef-building coral growing on the bank at depths of from 40-50 fathoms was to him sufficient evidence that the bank was not a "drowned atoll," but something that "was very much alive" (Mill); and this fact, taken in conjunction with our knowledge of other banks existing quite near to the surface in tropical seas, and on which corals could conveniently grow to the surface and there form a ring or atoll, is considered sufficient to confirm Mr. Murray's ingenious theory of upgrowths as opposed to the theory of subsidence. I do not precisely see where the argument comes in; the crateral hollow, narrow elevated rim, and subdividing channels have all still to be explained, and the fact that reef-building corals have been found growing in diminished luxuriance at 40-50 fathoms, instead of what had formerly been assumed to be the virtual lowest level of 20-30 fathoms, in no way simplifies the problem. What it in reality does show, and nothing more, is that corals in exceptional localities may grow at greater depths than either Mr. Darwin or Professor Dana supposed, and leaves entirely untouched the general problem of subsidence, which is grounded on much broader facts than the testimony of a single bank or reef. A continual dredging of "rotten rock" in the central depression, which, as Mr. Mill well says, points to the conclusion "that active life and rock-growth are taking place there only in restricted patches," is admitted, and this fact, if it signifies anything, is favorable to the subsidence theory rather than to the reverse.

PRELIMINARY REPORT OF THE ARCTIC EXPEDITION
OF 1893-'94.

CIVIL ENGINEER R. E. PEARY, U. S. N.

CAPE YORK, Greenland, August 27, 1894.

PRESIDENT ANGELO HEILPRIN,

Geographical Club of Philadelphia,
Philadelphia, Pa.

DEAR SIR :—It gives me pleasure to comply with your request to furnish the Club with something concerning the work of my expedition. As the results of the expedition are, unfortunately, yet incomplete, what I write will of necessity be brief.

After the *Falcon* left last August the work of completing the house and of transporting the supplies to the edge of the ice-cap were carried on simultaneously, and by the end of the month both were practically completed. The inland-ice-party, comprising Astrup, Carr, Davidson and Lee, in charge of Astrup, then left for the ice-cap to commence the autumn campaign, and at the same time a hunting party, under Entrikin, started for Olrik's Bay after deer.

The inland ice work continued without interruption until the middle of September, when Astrup was taken sick and obliged to return to the lodge; the supplies at that time had been advanced some twelve to fourteen miles from the edge of the cap.

After this a succession of storms, together with several mishaps, among them the invaliding of Carr with a strained back, and the loss of several sledges, blown away by the wind, militated against the work, and in spite of every advantage taken of favorable weather, November 12th, when the last party left the ice-cap, found the supplies only twenty-six and a half miles from

the edge of the ice-cap. This ended the autumn campaign. An ample supply of venison had been obtained by this time, and the party settled down for the winter.

The winter was passed in much the usual way of Arctic expeditions, with the exception that an unusual amount of sledging was done by the party, some three hundred miles being covered during the December moon, and some four hundred more in the January moon and between the reappearance of the sun and the start on the inland ice. During the winter no serious illness occurred.

The latter part of February, after the return of the sun, was devoted to the work of obtaining dogs and dog-food from the walrus hunting-grounds of Peterahwik. Towards the last of this month Lee, with two natives, started in on the ice-cap to reach the cache established the previous fall, build snow igloos and prepare for the coming of the main party. Unfortunately, Lee lost his way in a storm, and after wandering for some forty-eight hours without food or sleep, reached the lodge in an exhausted condition and with a frozen toe.

On the 6th of March the start was made for the inland ice, all the party, except Carr and Henson, leaving the lodge. The cache of the previous fall was reached without difficulty, and from here Messrs. Stokes and Swain and the Eskimos returned to the lodge. At the next camp beyond this Astrup had another attack of illness, similar to the one of the previous fall, and Lee's frostbitten toe was nipped again, so that it became necessary for both to return to the lodge. Three camps beyond this the party encountered a severe storm, which lasted for three days, and was probably the severest ever experienced by an Arctic party.

For thirty-four hours the wind velocity registered by the Robisson anemometer was 48.1 miles per hour, the average temperature for this time being in the neighborhood of -50° , with a probable minimum of -60° . As a result of this storm, Davidson

was incapacitated by a frozen heel, and returned to the lodge, the Doctor accompanying him. This storm proved to be the Waterloo of the journey, though the full extent of its disastrous effects did not develop until later on. Several of my dogs were frozen to death, others had feet and legs partially frozen, and all were more or less affected by the terrible ordeal.

A succession of storms after this, giving my dogs no chance to recuperate, the Piblockto, or dog-madness of this region, appeared among them, and this, with the delay from the storms, and the lateness of the season, decided me on the 10th of April, when 124 miles from the edge of the ice, to attempt no further advance, but to return to the lodge and make a second attempt the following season. The bulk of my supplies were cached here, and on the 20th the party reached the lodge. The experience of the trip, severe as it was, convinced me of the correctness of my views, and of the practicability of my plan, and gives me strong hopes for the future.

Before my return Astrup had started for Cape York to make a survey of the northern part of Melville Bay. This he successfully accomplished, returning early in May. Sledge journeys by Entrikin and Dr. Vincent to Etah, by Clark and myself to Peterahwick, by Mrs. Peary and myself to Olrik's Bay, and by Lee and myself to Cape York, where we discovered the meteoric ironstone of Sir John Ross, occupied our attention until towards the middle of June, and after this various hunting trips took up the time till the arrival of the ship.

I shall, in the coming year, carry out my original plans as far as practicable, and with the added experience and the assistance of the Eskimos, whom I can utilize as a supporting party, I feel confident of success, even with my reduced party.

Very sincerely,

R. E. PEARY,
Civil Engineer, U. S. N.



"AUX DÉFENSEURS DE BELFORT--1870-71."

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BULLETIN
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SOME FACTS ABOUT ALSACE AND LORRAINE.¹

THOMAS WILLING BALCH, A. B., HARVARD UNIVERSITY.

(Read before the Geographical Club, January 2, 1895.)

Of international questions that at present threaten the peace and prosperity of a large portion of the world, one of the most interesting and important is that of Alsace and Lorraine. For, as we look along the corridors of the history of those fair provinces, we see many of the great sovereigns, generals, statesmen and conquerors of the world pass to and fro before us. Every one who has read "De Bello Gallico" knows of Cæsar and his bridge across the Rhine. Of other great men connected with Alsace and Lorraine we easily evoke from the pictures in our memory Charles the Fifth, Richelieu, Louis the Fourteenth and Turenne, Von Moltke and Bismarck. And for us Anglo-Saxons it is worth noting that it was along the line of the Vosges Mountains that the advance of Roman customs and of the Latin tongue was checked. Some one has said that "The retention by Germany of Alsace and Lorraine is the one obstacle to the per-

¹ Copyright, 1895, by T. W. Balch.

manent peace of Europe." This seems an extravagant statement, but certain it is that this question influences every move on the chess-board of European politics, and many of them—such as the formation of the Triple Alliance and the Cronstadt demonstration—are direct outcomes of it.

In October of 1890 I passed through the *Reichsland*². The impression that I had formed of the country and its inhabitants was, that it was a land originally peopled by Germans that France had annexed, piece by piece, during the sixteenth and seventeenth centuries. I knew that the Alsacians in the course of several generations had become so attached to their new fatherland—especially on account of the facilities for freer trade, and the greater freedom of the individual, which, with the rest of the French, they obtained by the Revolution of 1789—that they protested in 1871 against the annexation of their country by the Germans. But I had also always heard that the Germans annexed Alsace and Lorraine on the theory expressed in one of their war songs:

"Was ist des Deutschen Vaterland?
So nenne endlich mir das Land!
So weit die Deutsche Zunge klingt
Und Gott in Himmel Lieder singt!
Das soll es sein!
Das, wackrer Deutscher, nenne dein!"³

In other words, so long as there were German-speaking people under foreign rule, Barbarossa's beard had not yet grown seven times round the stone table in the Knyphäuser. I was also under the impression that Alsace and Lorraine had been part of the Holy Roman Empire, and that several of the cities besides Strasbourg had been free cities of the Empire. I believed then,

²This is the official name given by the Germans to the annexed provinces and means "Land of the Empire."

³"Des Deutschen Vaterland." The words were written in 1813 by Ernst Moritz Arndt and the music in 1825 by Gustav Reichardt.

that France's only claim to Alsace and Lorraine was that she had held them so long that the people had become in the course of time Gallicized so completely that, though they still spoke the ancient tongue of their German ancestors, along with that of their new country, they had by 1870 become completely French at heart.

Accordingly, as I journeyed from Bâle to Strasbourg, I was not surprised at what I heard and saw. At the stations and in the car I heard German; everywhere I saw German names and German signs. At Mulhouse a number of people got in, and three or four of them, a soldier among the number, exchanged remarks about the weather, the state of the crops, *et cetera*. The conversation lapsed. One of these men, who had been talking, and sat immediately opposite to the soldier, pulled out a newspaper, *Le Petit Journal* of Paris. Here, then, was a man to all appearances a German, who spoke to his fellow-passengers in German, reading a newspaper published on the other side of the Vosges. At the station before reaching Strasbourg all these travelers got out, and a new set took their place. The newcomers were four—a father, a mother, a girl of about sixteen and a small child of three or four. They appeared, like all the others, to be German. The three older members spoke to one another in German, but whenever they addressed a word to the little child, they always spoke in French. It seemed that as they knew two languages, they wished, like sensible people, to teach them both to their children. But when the conductor put in his head at the window and asked in German for their tickets, they at once spoke to him in French, and made him answer them in the same language. At the station in Strasbourg all the railroad employés were busy talking German. There was a poor woman at a news-stand reading to her child out of a book. A German officer asked her in German for the *Kölnischer Zeitung*. She answered in the same language, and sold him the paper. She had on her table a large pile of

Le Petit Journal, but what was more interesting was that as she opened her book again she read to her small boy in French. The cab driver, too, who drove me to the Pariserhof, took pains to speak in French. At the hotel the employés were all Germans by birth, and when I spoke to them in their own language, much to my astonishment, they did not once try to speak to me in English, to show me, according to the custom of European waiters, how much better they could speak my own tongue than I could theirs. On the contrary, they seemed anxious to speak in German, as if to emphasize their nationality. The next day, walking about the town, on every side I saw German names—such as Schneider and Holzmann. But in many ways it was easy to see that at heart the Strasbourgers were French. For instance, in the window of a grocery store on the Broglieplatz⁴—all display of French flags is rigorously forbidden in the Reichsland—the store-keeper, whose name on his sign was thoroughly German, had put in a conspicuous place some white candles, between two packages of red ones, wrapped at the bottom in blue paper. It was indeed a dull man who did not see at once the tri-color.

Strasbourg has two monuments that have an international fame: the tomb of Marshal Saxe and the cathedral. The monument erected to the memory of the great marshal of Louis the Fifteenth is in the Evangelical Church of St. Thomas. It is made of white marble, and shows Death beckoning Maurice of Saxe into the tomb, while France is vainly trying to hold him back, and around him are allegorical figures representing the countries whose armies he had defeated. There is nothing in the church that can challenge comparison with the tomb in any sense and divert your attention from it, and, probably because it is quite alone, it appears to be finer than anything in Westminster Abbey.

The famous Cathedral of Strasbourg stands in the middle of

⁴ Named after a French marshal.



VIEW OF THE CATHEDRAL





OLD HOUSE--STRASBOURG.



the town. It is built in part in the German Romanesque, such as we see along the Rhine, as at Speyer and Worms; and the remainder is built in the Gothic style, showing German characteristics. Thus this great edifice, distinctly a German building in its lines and decorations, dating from 1179 to 1439, is additional evidence to prove that the Alsacians are of German origin. From the top of the cathedral tower you have a far-reaching view. All along the west you see the blue slopes of the Vosges running north and south, which divide the country off from France; and parallel to them, but a little to the east of Strasbourg, that great artery of commerce, the Rhine, which commercially links Alsace with Germany. Between the mountains and the river lies the plain of Alsace. Beyond the Rhine, far to the east, lies the Black Forest. Looking out from the steeple over the city, I was struck with its resemblance to Nuremberg, as the city of Albrecht Dürer appears from the tower of the castle where the ancestors of the Hohenzollerns used to hold their sway. The color of the roofs, the style of construction of the houses of old Strasbourg, were almost identical with those of the city of the Meistersingers. My guide, as he pointed out to me the objects of interest, spoke in German, and, like every one I had seen, he looked German. By and by, when I could not quite understand something he was explaining, he said: "Perhaps you can understand French better?" "Yes," I answered. That was the end of German. He at once rattled away in French. I asked him whether he was a German or a Frenchman. "I am an Alsacian," he answered. But as he was describing the bombardment of Strasbourg and pointing out where the German batteries stood, and telling how bravely General Uhrich resisted, just after saying the Germans were many tens of thousand strong, he unconsciously disclosed his national feeling by the expression, "But *we*, militia, police and all, were but seventeen thousand." He then told me how only German was

taught in the schools, and how all the well-to-do French had left for France.

The Germans have made of Strasbourg a great intrêned camp, with outlying forts. They are doing everything they can in the way of adding to the importance and prosperity of Strasbourg—as, for example, building an imperial palace, constructing new bridges, laying out handsome streets in the unbuilt quarter, rehabilitating the ancient University—to reconcile the inhabitants to their new nationality. In 1890 there was no apparent sign to show that the Alsacians were in the least reconciled to their present position. To see a people speaking among themselves the language of their fathers and yet bitterly opposing by all the means in their power the attempt to join them once more with that nation of whom, geographically and ethnologically, they naturally form a part, seems very strange.

" Dis-moi quel est ton pays :
Est-ce la France ou l'Allemagne ?
C'est un pays de plaine et de montagne,
Que les vieux Gaulois ont conquis
Deux mille ans avant Charlemagne,
Et que l'étranger nous a pris !
C'est la vieille terre française
De Kléber, de la *Marseillaise* !"⁵

It is only the greater freedom, both commercial and individual, that the Alsacians gained by the French Revolution, that appears to explain their attachment to France and resistance to Germany.

The railroad from Strasbourg to Metz crossed the Vosges. Outside of the land of the snow mountains I have seldom taken a more beautiful railroad ride. The mountains were not high, but the autumn coloring of the forests was charming, and the works of man were in keeping with the beauties of nature. Now

⁵ *Eckmann-Chatrian.*

and then there were the ruins of a feudal castle on some commanding hilltop. The railroad, part of the time, passed close to a canal that connects the Rhine with the Marne. In that land, where you could almost smell the preparation for war in the air, man was not unmindful of the economic laws of nature that govern the rainfall and the depths of the streams. Not only were the forests cut and replanted according to the most scientific knowledge, but, along the roadsides and the banks of the canal, trees were planted, affording shelter to both man and beast against the summer sun. You passed by the station at which you take the train for Phalsbourg, the town made so famous by Erckmann-Chatrian's stories of the great Revolution and the Napoleonic epic. That union of two authors, one with a German, and the other with a French, name, was a hint of the difference between the two provinces. For from there on, as the train moved out from the Vosges Mountains into the plain of Lorraine, there was a complete change in the appearance of the people. You no longer saw Germans, but Frenchmen; and in the villages through which the train passed, the German names had given place to French ones. At the station at Metz the employés were German; but as soon as you crossed the old fortifications of Vauban, the great military engineer of the wars of Louis the Fourteenth and Marlborough, you heard French on all sides, saw French men and women, and saw French names, such as Antoine and Jacques. The houses, too, looked very different, both in their lines and their coloring, from those of Strasbourg. The names of the streets were posted up in both languages. For instance, you read "Königsplatz," and immediately under it you saw "Place Royale." So, too, with all official announcements. On the right hand you read the word, "Notiz," with the text underneath in the old Gothic characters, while alongside there was an "Avis," with the text below in French. It was hardly worth while

to ask the reason for this use of French; it was easy to see that while a German race inhabited Strasbourg, a French people lived in Metz. At the hotel, too—Grand Hôtel de Metz—you noticed a great difference from the Pariserhof of Strasbourg. The proprietor was a Latin, not a Teuton, and, excepting the waiters in the dining-room, the employés were French. There is on the Esplanade a monument to the most famous of Napoleon's marshals—Ney. Near the cathedral, on the Place d'Armes, there stands an old statue of Marshal Farnese, Governor of Metz in the time of Charles the Fifth. There is a fine cathedral at Metz. It is, I think, more imposing and graceful than that of Strasbourg. It is totally different from any church in Germany. It was begun in the thirteenth century and finished in the sixteenth, and belongs to the decadence of the Gothic style. Without being as fine, it is distinctly in the Gothic style that prevailed in the Ile de France and adjoining provinces. The difference between the cathedrals of Strasbourg and Metz is one of the best illustrations of the difference of the people in the two provinces. For, during the Middle Ages, men of one nation could not build as those of another; Germans could not build as Frenchmen, nor Frenchmen as Germans. Not only that, but even the men of one century could not build in the same style that their countrymen worked in a hundred or a hundred and fifty years before them. The architecture of Europe, from the year one thousand to the Renaissance, first developed into what was known in England as the Norman style, and on the continent as the Romanesque. That was followed by the Pointed style in England, and the Gothic in the continental countries, the best and noblest development of which was in the free communes of the north of France. Indeed, I believe, that, barring Englishmen, most people are agreed that the great Gothic churches of Amiens, Reims, Paris, Chartres and Beauvais are the finest structures that have been built since the era when the Greeks built



CATHEDRAL OF METZ.



the Parthenon. But, until well towards the Renaissance, whatever the style, the work of a race is clearly shown in the mode of construction; nay, even the people of a shire or province showed in their work their local characteristics. The difference between the cathedrals of Strasbourg and Metz—one of German construction, the other of French—is a strong proof, I think, of the original difference in the nationality of the two provinces.

There is only one thing to show that the southwestern half of the part of Lorraine that the Germans annexed in 1871 is historically a German land; it is the name of its chief town—Metz. That is a German name; but as it is surrounded on all sides by villages with French names, and the district around it is known to the inhabitants as “le pays Messin,” and every other thing about the town, except the garrison, and the Germans who have settled there since the war, are French, it would seem to be a Teutonic name that has straggled across into the land of the Latins, just as you find along all frontier lines a mingling of names.⁶

Indeed, the only claim that Lorraine was originally a German land that the French annexed and then Gallicized, is, that Lorraine came, in one way or another, probably through the marriages of some kings or princes with the heiresses of the Dukes of Lorraine, to be, according to the rules of the feudal law, a part of the Empire. If you will sail down the Rhone from Lyons to the sea, you can hear the people speak of the right bank as the “Royaume” and the left as the “Empire.” Those terms have come down from the time when the right bank belonged to the Kings of France, and the left to the Holy Roman Empire. Yet no one would say that the people of the left bank were not Frenchmen simply because their land, some centuries ago, had

⁶ *Illustrirte Kriegs-Chronik: Gedenkbuch an den Deutsch-Französischen Feldzug von 1870-1871*, Leipzig, 1871, pp. 48, 47; *Précis de la Révolution Française*, par J. Michelet; Paris, C. Marpon et E. Flammarion. Map entitled “La France sous La Révolution;” *Atlas de Géographie Historique*; Paris 1894, Hachette et Cie., *Carte No. 40*, “Limite des langues en Alsace-Lorraine, d'après Pfister.”

formed part of that conglomeration of nations—the Holy Roman Empire, of which Voltaire said that “it was neither Holy, Roman nor an Empire.”

The environs of Metz are interesting. It is surrounded by a number of high hills on which there are strong forts. You are allowed to drive about in parts of this enclosure, but if you should happen to go too near the forts without a permission card, you would probably spend the next night in prison, and what would then happen it is difficult to know. Indeed, at table d'hôte, I heard German commercial travelers say that, without a permission card, they would not dare walk in the country about Metz, even at a great distance from any of the forts. One of the places that you are allowed to see is the house where Marshal Bazaine had his headquarters during the war of 1870-71. It is a country house a mile or two outside the town, prettily situated among some trees at the foot of one of the high, fort-crowned hills. Near Bazaine's headquarters, I saw a sergeant teaching some raw recruits to fire from behind trees, and the way they did their work was truly wonderful. The sergeant went from one man to another, showing each one the proper position for loading and firing. But no sooner did he move on to the next man than the recruit he had just left would get out of position and assume some grotesque attitude, suggesting that he was trying to break the tree, or perhaps that he had cramp in his leg.

From the top of the Cathedral of Metz you have a more restricted view than from that of Strasbourg. The country is much more hilly. Metz itself is in a level valley, with high hills around it that command the surrounding country, the fertile “pays Messin,” as the inhabitants call it. To the west you see the village of Mars-la-Tour and the Chaussée of Gravelotte, where two great battles were fought in August, 1870; and to the southeast Pont-à-Mousson, which is the first French station on the road to Paris. The man whom I found at the top of the

tower, where the Germans have a signal post, when he learnt that I was an American, said : " Ah, yes, we are idiots in this part of the world ; we fight while you Americans get our money." His remark reminded me of the famous telegram that King William of Prussia was said to have sent after the battle of Gravelotte to Queen Augusta :

" By the will of Heaven, my dear Augusta,
We've had another awful buster ;
Ten thousand Frenchmen sent below,
Praise God from whom all blessings flow."

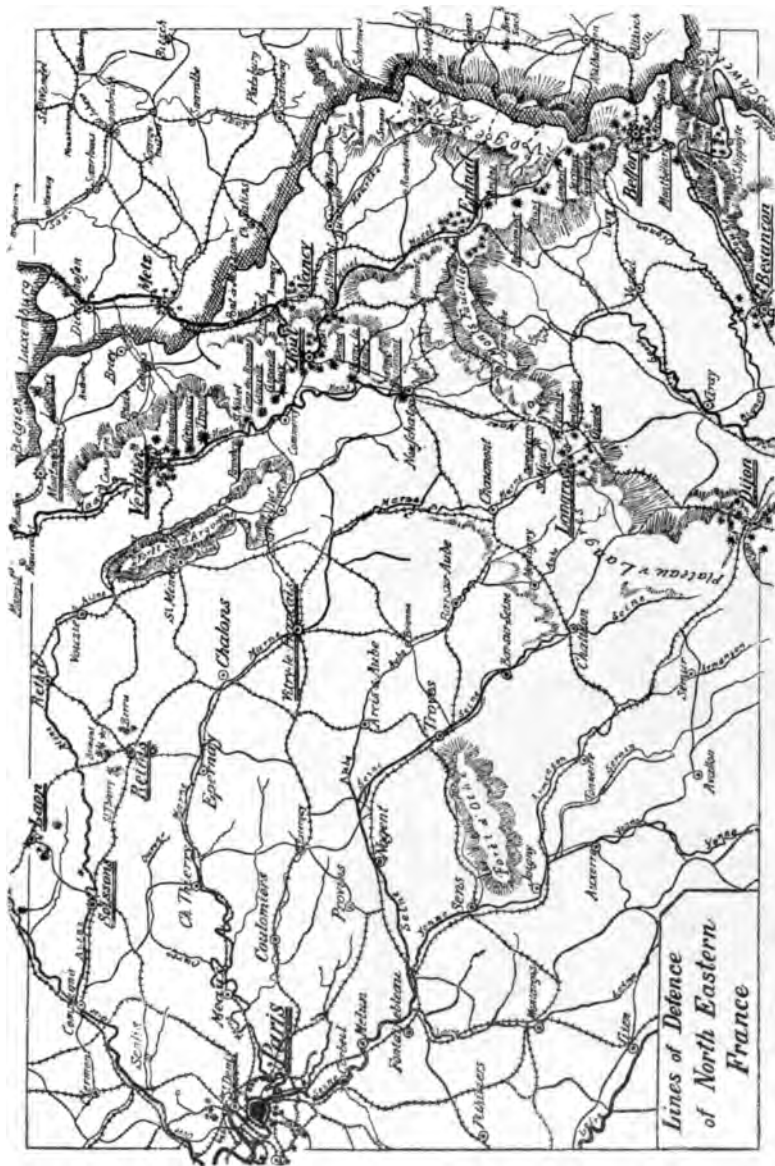
You can observe very clearly from the tower of the Cathedral of Strasbourg how the town started and slowly developed to its present size. You see that Strasbourg was originally built on an island formed by the Ill separating into two channels. The arms of the river were a natural defense for the inhabitants and as each channel was narrower than the united streams, it was easier to cross from bank to bank. In consequence, Strasbourg became a port on the line of commerce as it moved up and down the neighboring Rhine. Then you can see some remnants of the old walls and towers of the Middle Ages, which the Strasbourgers built when they extended their city to both sides of the Ill. Again, further away, there are parts of the fortifications of Vauban, which made Strasbourg one of the strong places of France in the time of the Old Régime. Much further out you see the modern *enceinte* that the Germans have built, and in the far distance, on both sides of the Rhine, the detached forts, without which no place is now considered a citadel of the first class.

Metz expanded in much the same way. It was built on a group of small islands in the Moselle, and became a mile-stone on the road from France to Germany and gradually expanded as it grew, first in commercial, then in strategic, importance. Some of its old mediæval fortifications still remain. The *Porte des Allemands*, a castellated gate of the middle of the fifteenth cen-

tury, still stands as firm as when Charles the Fifth invested the town in mid-winter.

For another war the Germans have prepared their plans for an aggressive campaign against France. The only places they have fortified on a great scale are Strasbourg and Metz. The former is an intrenched camp, and to-day, owing to the high hills crowned with strong forts that encircle the latter town and dominate the "pays Messin," Metz, along with Belfort, is now, next to Paris, the strongest fortress in the world. All other fortifications in the Reichsland the Germans have dismantled. Their idea is to mobilize and advance their forces so quickly that the French will not have time to attack. Behind the Reichsland there is a strong line of great fortresses running from Cologne in the north to Ulm in the south, which would serve as a line of defense in case the Germans were beaten back across the Rhine.

The French, on the contrary, have placed great reliance on fortifications. The frontier line that was agreed to by the treaty of Frankfort gave the Germans a decided strategic advantage. Metz in the hands of France was a great bulwark of defense on her northeastern frontier, and in Strasbourg she held the key that opened the door for an attack across the Rhine. But to-day, Strasbourg, with the line of the Vosges Mountains, affords to Germany ample protection against a French attack, and, with Metz in her hands facing the open plains of Lorraine, she holds, as it were, a sword in the side of France. Near to Switzerland, the French have in Belfort a place naturally of great strength. It guards the natural highway from France into Germany, between the Vosges and the Jura Mountains, known as *la Trouée de Belfort*. But from there to the Belgian frontier they have had to build up an artificial line of defense. Epinal, Toul and Verdun they have turned into fortresses of the first class. Then, to strengthen the line between these four towns, they have built a chain of small forts. These citadels are placed at such a distance





that, except in the country from Verdun to the Belgian frontier, and the few miles between Epinal and Toul, an army attempting to enter France from Germany must pass under the fire of one or two forts. To the north of Verdun there are no forts and between Epinal and Toul there is a break in the chain of defense; but behind that opening the French have built a great intrenched camp at Neufchâteau; and it is generally supposed that they have left these gaps as traps for the Germans to enter. The second French line of defense consists of the fortresses of Besançon, Dijon and Langres to the south, and Laon, Soissons and Reims to the north. Again, back of that, Lyons, Paris and Lille form a third line.

Military men have argued that both combatants are so strongly posted along the Alsace-Lorraine frontier that it will be almost impossible for either side to make a direct advance, and that one or the other might be tempted to make a flank attack either through Switzerland or Belgium. On the Swiss side the Jura Mountains, covered with Swiss sharpshooters, will make it difficult to turn either line from the south. Belgium, however, is not so well protected by nature as the small Federal Republic, but she has fortified a number of important points. As an attack through either of these neutral powers would at once bring its army into the field, it is likely that neither France nor Germany will molest them.

It has once or twice been mooted that the difficulty might be amicably settled by Germany returning the Reichsland, or even only Metz and French-speaking Lorraine, to France, who in return would give hard cash or some of her colonial possessions, or both. Admirably suited as this question is for argument before an International Court of Arbitration, the talk of France buying back the whole or even a part of Alsace and Lorraine, except at the point of the bayonet, seems but an "iridescent dream."

The Alabama and the Behring Sea cases were radically dif-

ferent from this one. In both those disputes the claims were rather private than national in their character; that is to say, they were not of such a sort that the national position and prestige and power of either of the two litigants were involved. In neither of those cases was the possession of territory at issue, nor were those disputes legacies left by bloody and bitter wars between the litigants. In this case, however, the possession of Alsace and Lorraine, with their rich mineral deposits and the strong strategic positions of Strasbourg and Metz, gives their possessor an immense advantage in resources and position for any future war.

The French view of the question is best summed up in a phrase of Gambetta: "*Ma seule ambition est d'avoir ma statue à Strasbourg.*" The French will be satisfied, for some time at least, with nothing less than the recovery of both provinces. They are not likely to forget soon the land of Kléber and Kellermann, nor that it was at Strasbourg that Rouget de l'Isle wrote the "Marseillaise."

The only thing that would induce the Germans to return the whole or a part of the annexed provinces in order to pacify the French, is the fear of that powerful people that has extended its sway from the Baltic to the Pacific, from the Arctic Sea to the Hindoo Koosh. And they have good reason to fear that race, for all the signs by which we can judge such movements of race expansion as those that have gone on for centuries within the Empire of the Tzars, show that, in all probability, together with the Anglo-Saxons, the Latins, and some of the Orientals, the Russians are destined to divide the world.

The Germans will never peacefully give up Alsace and Strasbourg, as they are necessary for their security. For, as Bismarck said in the Reichstag, with Strasbourg in the possession of France, a door was wide open for a French attack across

the Rhine.⁷ Metz and Lorraine the Germans annexed, expressly because Metz was so placed that it laid bare the French frontier. It is not probable, now that they have thoroughly aroused the hatred of the French against themselves, that the Germans will weaken their present frontier because the inhabitants of half of the part of Lorraine that they annexed are of French origin, especially as they did not consider the feelings of the people of Lorraine, but their own interests, when they took that province. It was the intensity of German national feeling that rallied the South German States to the aid of Prussia, and subsequently demanded for their protection the annexation of Alsace and Strasbourg and part of Lorraine.

There are other forces at work, however, which each day make it more certain that the *status quo* will be maintained. One is the enormous present cost of war, which is each year becoming greater. Another is the disproportion in the population between Germany and France that is increasing every day. The reason why Germany so quickly and completely defeated France in 1870, was, that Prussia, under the skillful leadership of Bismarck and Von Moltke, was thoroughly prepared for that war, while France was utterly disorganized. The French, owing to their total lack of organization, in vain tried to advance their forces to invade Germany; and it was not until after the proclamation of the Republic that the French were able to show that they still could fight. In 1870 the Germans were only slightly superior in numbers, but to-day the difference in their favor has largely increased, and is likely to increase still more, and we may remember the dictum of the greatest general of modern times: "*Dieu est avec les gros bataillons.*"

A great number of French left Alsace soon after the war, while many Germans settled there, and this movement still goes on. For example, Belfort, which before the Franco-German

⁷ Bismarck's speech of the 2d of May, 1871.

war was a town of about seven thousand people, now numbers over twenty thousand inhabitants, most of the newcomers having lived before the war in Mulhouse. As they left, their place was filled by Germans. But it is not only in the Reichsland that Germany has all the best of this movement of races. At the beginning of the Franco-German war France had thirty-eight millions inhabitants and Germany forty-two. Since then the French, unlike their hardy and determined cousins on the banks of the Saint Lawrence, have failed to increase, while the Germans have gained in numbers until they now number six millions more than they did in 1870. If this increase on the part of Germany continues for a few years more, it will settle the question, as between her and France alone, irrevocably in her favor.



THE "FALCON" IN THE ICE OF INGLEFIELD GULF.

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THE PEARY AUXILIARY EXPEDITION
OF 1894

BY

HENRY G. BRYANT

Recording Secretary Geographical Club of Philadelphia

With Supplementary Reports

by

PROF. T. C. CHAMBERLIN, Geologist

DR. AXEL OHLIN, Zoölogist

List of Plants Collected, Etc.

Greenland may be regarded as one of the few countries which still present problems of primary importance to the explorer. Known to Europeans since the days of Erik the Red, the wandering Viking who is credited with discovering and colonizing the region in the latter part of the 10th century, the northern and northeastern outlines of this great continental area are still represented on our maps by lines of conjectural rather than ascertained exactness. Yet, in view of the physical disadvantages attending research in the region, the achievements of the past cannot be lightly estimated and the eventual survey of the unknown

area may justly be regarded as a geographical work requiring the highest qualities on the part of the Arctic traveller.

Interest in Greenland exploration has been stimulated in America within the last four years, by the two expeditions of Civil Engineer Robert E. Peary, U. S. N., and many of that generation which followed the achievements of Kane, Hayes and Hall with acclamation are still interested in the outcome of this latest attempt to wrest from nature the secrets which still lie hidden in the solitudes of the far north.

As a result of a preliminary journey to the west coast of Greenland, and a reconnaissance on the inland ice, in the summer of 1886, Lieutenant Peary determined to organize an expedition with headquarters in the Inglefield Gulf region, where the inland ice was more accessible than farther south. The uniqueness of his plan consisted in the utilization of the smooth surface of the interior snow-cap as a means of advance, and he asserted that, to a properly equipped sledge party, this great white plain presented an "imperial highway" to the north. The success of this new departure in Arctic travel was fully demonstrated by the results of the Peary North Greenland Expedition of 1891-92. By minute attention to the details of his equipment, the use of concentrated food and the adoption of a light, Eskimo style of dress, Lieutenant Peary, with one companion,¹ succeeded in making a remarkable sledge journey of some 1300 miles over the inland ice. He eventually reached 82° N. Lat. and made observations which led him to believe that Greenland was an island, separated by a well defined channel from the detached land masses which extended towards the north.

On his second expedition, which reached Bowdoin Bay—a northern indentation of Inglefield Gulf—on August 3rd, 1893, Lieutenant Peary hoped to profit by the lessons of his first attempt, and furthermore, by making an earlier start, to reach Independence Bay, the limit of his former journey, early enough in the season to undertake a dash over the sea ice towards the outlying islands which he had observed stretching to the north towards

1. Mr. Eivind Astrup, of Christiania, Norway.



Mr. Emil Diebitsch. Dr. H. E. Wetherill. Prof. Wm. Libbey, Jr.
 Mr. H. L. Bridgman. Mr. Henry G. Bryant. Prof. T. C. Chamberlin.
 SIX MEMBERS OF THE PEARY AUXILIARY EXPEDITION OF 1894.

the polar area. His plans also included the despatching of a subsidiary party from Independence Bay down the unknown north-east coast of Greenland as far as Cape Bismarck (Lat. $76^{\circ} 47'$), from which point a retreat was to be made across the interior to the headquarters at "Anniversary Lodge" on Bowdoin Bay. The successful execution of these plans would have been a noteworthy achievement in Arctic annals, and great interest was manifested in the issue of Lieutenant Peary's undertaking.

Before leaving for the north on his last journey, Lieutenant Peary had arranged for the despatch of the steam whaler "Falcon" with a relief party, whose mission should be to reach "Anniversary Lodge" and afford the explorers the opportunity to return in safety to the United States. Lieutenant Peary himself provided the greater part of the money required and the direction of the undertaking—known as the Peary Auxiliary Expedition of 1894—was placed in the hands of the officers of the Geographical Club of Philadelphia. In the spring of the year 1894 the organization of the party was entrusted to the writer, while a committee was designated to assist in an advisory capacity. To the members of this committee, Prof. Angelo Heilprin, Mr. Amos Bonsall, Mr. Talcott Williams and Mr. G. W. Hart, I am indebted for much valuable aid in perfecting the preliminary arrangements.

As subordinate to the main object—the relief of Lieutenant Peary's party—the plans of the expedition included a search for traces of the Swedish naturalists Björling and Kallstenius, and an examination and survey of the unknown north shore of Jones Sound.

I esteem myself singularly fortunate in the personnel of the party. Those who volunteered on the expedition united to scientific attainments of the first order, varied experience in travel, enthusiasm for their work and a philosophical cheerfulness which never failed them during the many somewhat trying experiences of the journey.

The following "gentlemen adventurers"—to use an Elizabethan phrase—met together for the first time in Brooklyn, N. Y., on June 20th, 1894, and subsequently sailed on the S. S. "Portia" for St. Johns, Newfoundland: Prof. William Libbey, Jr.,

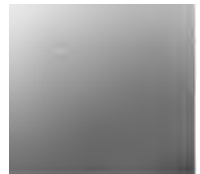
Geographer; Prof. T. C. Chamberlin, Geologist; Dr. Axel Ohlin, of Sweden, Zoölogist; Mr. Emil Diebitsch, Civil Engineer; Mr. H. L. Bridgman, Historian, and Dr. H. E. Wetherill, Surgeon.

After a speedy and uneventful voyage the "Portia" reached St. Johns on June 25th. Here we were to go on board our own vessel, the steam whaler "Falcon," a bark-rigged craft of 311 tons net register, which had been chartered for the voyage. In past years, the citizens of St. Johns have witnessed the departure and return of nearly all the American Arctic expeditions, and they extended a cordial welcome to the members of our party. Our vessel not being in readiness, a tedious delay of eleven days intervened before we were able to move on board the "Falcon." The time was agreeably occupied, however, in excursions in the neighborhood and in accepting the social attentions extended to the members of the party by the Governor of the colony, the officers of Her Majesty's North Atlantic Squadron and others.

Here the final additions were made to our equipment, a year's provisions placed on board the "Falcon" and last messages sent to friends in the South. Captain Henry Bartlett, who had conducted Lieutenant Peary north the previous year, was again secured as Ice Master, and under him was the ship's complement of fifteen men—all hardy Newfoundlanders—veterans of the Arctic whaling service and northern sealing trade.

At length, all preparations being completed, on the afternoon of July 7th, our staunch little steamer swung out from her pier and slowly made her way down the harbor. As we passed the British cruiser "Cleopatra," the blue jackets manned the yards and gave us three rousing cheers. With this fraternal farewell ringing in our ears, we soon passed "The Narrows" whose stern and lofty walls guard the entrance to St. Johns, and ere long found ourselves embarked on the last stage of the long journey to the north.

During the ensuing few days the time was passed in unpacking trunks and boxes and in accommodating ourselves to the routine of life on shipboard. On the "Falcon" the food was plain and the passenger accommodations, especially on the return voyage, exceedingly restricted. But one scarcely looks for luxurious



surroundings on an Arctic cruise, and we became reconciled to the absence of many creature comforts as we realized the peculiar requirements of a vessel engaged in this northern work and observed how admirably the "Falcon" met these requirements.

On the morning of the fifth day out Cape Desolation, just north-west of the southernmost point of Greenland, was sighted 25 miles to the north-east, and we soon found ourselves approaching the belt of broken ice which is carried by the current down the east coast of Greenland and thence northward along the west coast for a distance of about 150 miles. Skirting along the edge of the loose pack, the delicate emerald and sapphire tints of the floating ice masses, weathered into strange shapes, aroused general admiration, while the lengthening twilights prepared us for the nightless day of the Arctic summer. For two days we pushed through or skirted the edge of the east coast ice, which compelled us, at times, to veer off several points to the westward of our course. Notwithstanding our distance from shore, which was usually about 25 miles, the outlines of the coast stood out with marvelous distinctness; so clear and still is the atmosphere in these northern latitudes. Here, too, we observed numbers of the large hooded seals (*Cystophora cristata*) sunning themselves on the ice pans. Of the five males which were shot for specimens the largest measured seven feet. Their heads were marked by the singular bladder-like appendage over the nose which distinguishes this variety of seal. The tenacity for life shown by these creatures was something extraordinary. While stretched out in the lee scuppers, long after we supposed the merciful bullets had done their work, one of these seals would raise his head and look defiance to his enemies.

About four P. M. on July 13th, we passed the Frederikshaab Glacier in the distance, and at eight o'clock the same evening slackened our speed for an hour while the surface drag nets were cast over, for the purpose of securing some of those minute marine animals whose presence forms so important a part in the economy of bird and fish life in the north. The evening being calm and warm, a successful "catch" was secured, to the delight of Dr. Ohlin, who promptly set to work to assort his prizes and




stow them away in the dark room and laboratory which had been built on the poop deck.

By dinner time next day (12.30 P. M.) we ran into a fog which enveloped the outlying islands and veiled the face of "Sukkertoppen," a prominent landmark of this part of the coast. Feeling our way through the fog, we must have encountered a strong northeasterly current; for, while at supper, the lookout startled us with the cry "breakers ahead," and rushing on deck we beheld across our starboard bow a line of surf beating against a rocky shore. The engines were stopped and we just had space to swing out in time to escape a rub on the rocks, which might have proved disastrous to our enterprise.

Nine days after leaving St. Johns the "Falcon" dropped anchor in the harbor of Godhavn, the Danish colony on the island of Disco, where lives Herr Anderson, the Inspector of North Greenland, a mild autocrat who presides over the destinies of some 135 Eskimo subjects. The Danes re-established colonies in Greenland in 1721, and thirteen trading districts are comprised within the North and South Inspectorates—the two principal political divisions of the country. Of late years the value of the Greenland trade has fallen off greatly, and it is understood that only pride in the ancient colonies and a sense of obligation to the dependent natives prevent the subsidized monopoly known as the Royal Greenland Trading Company from abandoning the country altogether.

The appearance of the "Falcon" entering the harbor with a brave display of bunting and thundering forth a salute from her ancient cannon, brought joy to the hearts of the natives who were soon swarming on our deck offering various specimens of Eskimo curios for barter and sale. The officials of the colony had received word from Denmark of our coming and extended a hearty welcome to our party, as did also Captain Bunde, the master of the Danish brig "Tialfe," which chanced to be in port during our stay. After paying an official call on Governor Elmquist, most of our party started on an excursion up a glacial river valley known as the "Blaese Dael;" this jaunt proved to be most interesting, taking us, as it did, past the sculptured, **basaltic**



columns of the region, over miles of rich green sward dotted with countless wild flowers glowing in the splendor of their summer beauty; high up the mountain side, across glaciers and over snow banks to the base of the ice-cap of Disco Island. Here, from an elevation of 1800 feet, a glorious view of Disco Bay, dotted with hundreds of icebergs from the Jacobshavn Glacier, entranced our vision and made a picture which will long live in memory.

Some seal-skin boots, to complete our equipment, were obtained here, and also specimens of the so-called meteoric stones of Disco Island. The two days of our visit passed quickly enough and after attending a ball given by the Eskimos in our honor, we boarded the "Falcon" on the evening of July 17th, and were soon steaming once more towards the north.

A heavy fog settled down on us after leaving Disco, and, to guard against collision with the numerous icebergs about us, the engines were run at half speed and a sharp lookout posted. When off Hare Island the curtain of mist lifted and we went ahead at our regular seven and a half knot speed. By nine P. M. the wide expanse of Umanak Fiord was crossed, where a majestic procession of icebergs was observed floating out to sea. Sanderson's Hope, the well-known landmark of Arctic chroniclers, which was reached by that famous old navigator, Davis, in 1587, loomed up over our starboard bow the next morning. Later in the day the weather again became "thick" and much excitement was caused by our encountering three polar bears, all of whom fell victims to the rifles of our party. The skinning of these huge ice-bears proved to be exhausting work to our amateur taxidermists, who were engaged on the work from six-thirty P. M. until midnight. At that hour the sun was shining brightly in the northern heavens and the distant peaks of the mainland reared their massive outlines above the bank of fog which hung along shore. All about us extended vast quantities of loose pack ice chilling the air and adding a desolate splendor to the scene. We had already encountered considerable of this heavy pack ice and were anticipating some difficulty in the passage of Melville Bay. The "Falcon" entered the confines of this dreaded battleground of Arctic navigators early in the morning of July

20th. We found the pack still substantially unbroken; but the presence of occasional "leads" of open water induced Captain Bartlett to attempt to advance by the "middle passage." After several hours of ineffectual effort, however, the outlook became so discouraging that it was deemed best to retreat to the south-east. Holding on our course as best we could through heavy ice and enveloped in a dense fog we made but slow progress and were compelled to stop the engines for an hour at 6.10 A. M. By 11 A. M. we had advanced a few miles, and the fog lifting, showed our position to be a little south of the Devil's Thumb. All day we made our devious way through favoring "leads" in sight of this landmark. In the afternoon thicker ice was encountered, many of the severed pieces revealing edges of fully forty inches. Oftentimes our approach to a favoring "lead" would be barred by a "neck" of this thick ice forty or fifty feet in width. Against this the "Falcon" would advance at full speed. Not only once, but over and over again would this maneuver be repeated. The staunch old ship, with her prow sheathed in iron and protected below the water line with greenhart planking, stood the force of these impacts with impunity, although the havoc wrought among the dishes in the saloon and cook's galley was something to be remembered. Two weeks earlier in the season this ice would have effectually stopped our advance, but we found it considerably weakened by the all-pervading sunshine, and the first westerly gale would probably disintegrate the greater part of the floe. The experience of the four Peary expeditions which have crossed Melville Bay eight times during the past four years go to prove that the traverse can be successfully made, in an average season, any time after the third week in July. By noon on July 21st, we had arrived off Cape Walker in Latitude $75^{\circ} 50'$ N. Some time before this we had entered the "Inner Run" of the whalers—this is the narrow leadway formed by the tidal crack between the fixed floe ice of the shore and the slowly moving drift ice of the bay. This course led us comparatively close to the shore of the bay, so illy defined on the charts. From our coign of vantage in the "crow's nest" we studied the coast as we moved ahead through the canal-like open-

ing in the ice-field. The inland ice here sweeps down to the sea, where it breaks off in huge sections, forming great tabular bergs and revealing a glacier wall perhaps unexampled for height and unbroken front. The mirage which hung persistently over the horizon distorted the outlines of the grounded bergs and imparted fantastic shapes to the nunataks which at intervals formed promontories in the great ice-wall. Comparatively few bergs were visible in the outer bay. This may be explained by the fact mentioned by the Danish officials, that violent north winds prevailed during the previous autumn. Coming from that quarter, at a time when the bay is free from ice, these storms would effectually disperse the fleet of bergs which usually ground here, and whose presence has been noted by most travelers to this region.

On Sunday morning, July 22d, when in sight of Cape York, which is regarded as the northern boundary of Melville Bay, we reached the end of the lane of water which we had followed so successfully, and at 6 o'clock found ourselves beset in the ice, just as we were congratulating one another on our good fortune in crossing the bay with comparatively little detention. I transcribe the following from my notes written at the time: "Our position is anything but pleasant, held as we are, between the fixed shore ice and the broken floe of the bay. Immediately after breakfast the ice about us, impelled by some mysterious force, closed in with a harsh, grinding noise. In front and to the rear of our position the huge "pans" crunched together, forming hummocks along the line of resistance, and at the same instant impelling the superimposed sheets against the sides of the vessel with great force. Slowly the black hulk of the "Falcon" was raised up, and directly after, given a "list" of nine degrees to the port side. All day we have remained in this helpless position, enveloped part of the time in a dense fog. Had we been thus beset while in the hard, thick ice of day before yesterday our position would have been indeed a critical one. As it is, the power revealed by the impact of this comparatively soft ice is strenuous enough to excite the concern of all on board."

After a detention of thirty-three hours, the ice mysteriously



opened up and permitted us to proceed to Cape York, where we arrived at midday on July 23d. This promontory marks the southern boundary of the habitat of the Northern Eskimos, were named "Arctic Highlanders" by the first white man who visited them in 1818. From time immemorial Melville Sound, with its inhospitable shore line, has been the impassable barrier between the primitive Eskimos of the north and the more civilized natives of the Danish settlements.

The "Falcon" was anchored for some hours to the shore near Cape York, and the natives were soon swarming about the ship. A number of us visited their camp, somewhat east of the cape proper, and found it comprised seven "tupics" or settlements. Here we obtained our first news of the safety of Lieutenant Peary's party, and here also I had the pleasure of re-introducing my acquaintance with a number of these hardy hunters, whom I had first met while in this region in the summer of 1897. The natives seemed prosperous and happy and received us with their proverbial friendliness. Four typical young matrons of the tribe submitted to the ordeal of the camera with varying degrees of acquiescence, as may be seen from the accompanying reproduction of the photograph.

Although enjoying none of the so-called advantages of civilization, these natives contrasted most favorably with the Southern Eskimos, who have been under the Danish influence for more than a hundred years. The latter have so large an admixture of white blood among them that it is well nigh impossible to find a genuine Eskimo type in the more important settlements, while in spite of the well-meant solicitude of the home government many of them, weakened by the excessive use of coffee, tobacco and European clothing, are losing their skill as hunters and falling victims to pulmonary and other diseases. On the other hand, we found no signs of deterioration among the small tribe of "Arctic Highlanders," who number all told only about 250 members. These interesting people possess all the virtues of isolated, primitive savages and seem to be holding their own from year to year in that bleak region, where, to a



THE "FALCON" BESET OFF CAPE YORK.

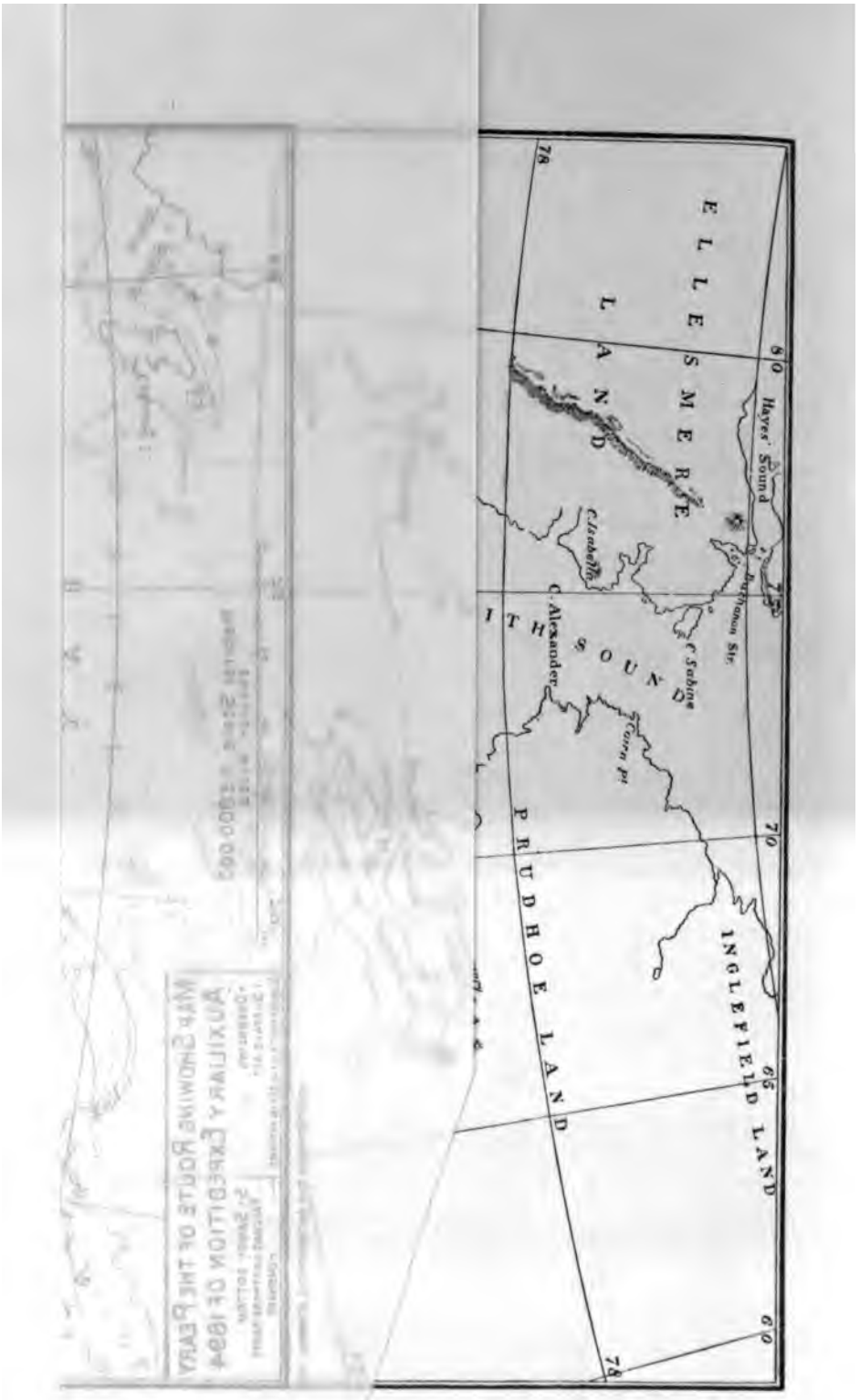


ESKIMO WOMEN OF CAPE YORK SETTLEMENT.



■

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white man, mere existence seems to be naught but a hopeless struggle with the forces of nature.

Leaving Cape York, we slowly made our way through extensive fields of loose pack ice, northward past the Crimson Cliffs of Sir John Ross and the great Petowik Glacier to the mouth of Wostenholm Sound. The expanse of open water usually found at this season, beyond Cape York, and which is called the "North Water," we found to be entirely absent this year. A circumstance which argued much for the severity of the winter just past.

Wishing to replenish our supply of fresh meat, two parties landed on a small island called Dalrymple Rock, and, in the course of three hours, secured some 87 ducks—welcome additions to our larder.

Since leaving Melville Bay our desire to view the superb scenery of the region and the succession of incidents attending our visits to Cape York and Dalrymple Rock had kept all of us on the alert for hours beyond the usual working day of more southern latitudes. Since passing the Arctic circle the distinction between night and day had been a purely arbitrary one, yet there seemed to be something in the constant daylight and pure air of the Arctic which stimulated all and enabled us to get along with a scant modicum of sleep.

Pressing on, we now set our course for the Cary Islands to visit the site of the last camp of the Swedish explorers. As some of my readers may not be acquainted with the history of the Swedish expedition, I venture briefly to relate the incidents which led to this last search for records of the unfortunate young explorers.²

Alfred Björling, an accomplished young botanist of Stockholm, was but twenty-one years of age when he undertook the leadership of this expedition to the Smith Sound region. Although so young he had already made his mark as a resolute and ambitious traveler. He was the first to ascend the peak of

2. Professor A. E. Nordenskiöld, in a lecture before the Society of Anthropology and Geography, of Stockholm, December 15th, 1893, gave an authentic history of the Björling expedition, which was printed in the Society's periodical, *Ymer*.

Kebnekaise, the highest mountain in Sweden. Later on, he visited the west coast of Spitzbergen as a member of a Swedish expedition. In 1891 he reached Upernavik on board a Danish trading ship, and, with a native crew in a small boat, made a journey as far north as the Devil's Thumb in Melville Bay. In May, 1892, with a fellow-student named Kallstenius, he arrived in St. Johns, Newfoundland, to perfect plans for reaching Ellesmere Land. Finding he was too late to secure passage on any of the whalers, with the scanty means at his disposal he purchased a small schooner named the "Ripple," which was regarded as unseaworthy by the prudent skippers of St. Johns. After much difficulty he succeeded in obtaining a crew and, at length, with high hopes for the future, and heedless of impending dangers, embarked on his last fatal voyage.

The "Ripple," with its crew of two sailors and a cook, brought them in safety to Godhavn, where they purchased a rifle, shotgun and a small boat. On August 3d, the five men sailed from Godhavn and were never afterwards seen alive. When autumn passed and no news of them reached Europe, their friends in Sweden, including Professor Nordenskiöld, took measures to ascertain their fate. In a letter sent from Godhavn, Björling had stated that he would leave a message on the Cary Islands, whither he proposed to go to replenish his stores from the English depot left there by Nares in 1875. The Scotch whalers sailing from Dundee were requested to visit the Cary Islands and look for this message. At length, in November, 1893, the whaler "Aurora" arrived at Dundee and brought the first news of their movements. Captain McKay reported that in June, 1893, the lookout on his vessel had discovered the wreck of a schooner on the shore of Southeast Cary Island, which, on examination, proved to be the "Ripple." The landing party also found the body of a man under a heap of stones near by, and in a cairn discovered four messages written by Björling.

From these messages it appeared that Björling reached the Cary Islands on August 16, 1892, and that his schooner was driven ashore the following day while the men were engaged in transferring the provisions from the English depot to the ship.



ALFRED BJÖRLING,
BOTANIST,
AGED 21 YEARS.



EVALD G. KALLSTENIUS,
ZOOLOGIST,
AGED 24 YEARS.

From "Ny Illustrerad Tidning," No. 47, Nov., 1893.



GRAVE OF A MEMBER OF THE SWEDISH EXPEDITION
On Southeast Cary Island.

This was the greatest misfortune that could have befallen the party, and not only destroyed their hopes of exploring Ellesmere Land, but endangered their chances of returning to the Danish Colonies. The most obvious course for them to have pursued was to have embarked in their small boat for Cape Parry, twenty-five miles to the eastward, and to have made the most of what remained of the summer in retreating south. On the Greenland coast they would possibly have been picked up by the "Kite," the vessel which passed Cape Parry on August 24th, having Lieutenant Peary on board, who was returning home from his first expedition. In any event, had winter caught them unprepared, they would have been assured of kind treatment at the hands of the Whale Sound Eskimos. Instead, however, of taking measures to escape, Björling, after wasting valuable time in a northern boat journey, conceived the desperate project of undertaking a voyage in an open boat to Clarence Head, on the western side of Baffin Bay. In his letter he stated that he would endeavor to return to Cary Islands by July 1st, 1893, in hopes of meeting a whaler, and closed by appealing as follows to any whaling captain that might receive his message: "I shall be very much obliged to you if you will go to Clarence Head (50 miles off), where I shall leave in a cairn information relative to our fate during the winter. Our provisions, if I cannot find Eskimos, will not last beyond January 1st. We are now five men, one of whom is dying." This last letter was dated October 12th, 1892.

The "Aurora" was headed for Clarence Head, but owing to the ice which constantly hangs along this coast, she was unable to get within twenty miles of shore. No further intelligence was received and this was the state of affairs when Dr. Ohlin joined our party as the accredited representative of Professor Norden-skiöld and the friends of the lost travelers.

Let me ask you to accompany me, when, on July 24th, 1894, in carrying out our mission to look for traces of the gallant young Swedes, we landed on Southeast Cary Island. It was late in the afternoon of an ideal Arctic day that the "Falcon" reached this bleak and desolate island, which a wealth of bright sunshine

could not relieve of its aspect of dreariness. No sign of the wrecked schooner "Ripple" could be found, but the site of the last camp of the Swedes was located. Here the retreating snow revealed scattered about in confusion numerous memorials of the brave but foolhardy adventurers. A silver watch, zoölogical note book, botanical press and a few other articles were selected from the mass of relics. We left a record of our visit in a cairn on the highest point on the island; but a careful search here, as well as on the middle island of the group, where we subsequently landed, revealed nothing which would shed further light on the fate of the travelers. We found, however, in a conspicuous cairn on the southeast island, a note stating that the whaler "Eclipse" had arrived at the island on July 6th, and that Mr. Elis Nilsson, the Swedish representative on board, had searched in vain for information about his countrymen. We noted also, that the grave of the man who had died there, had been despoiled, presumably by the huge burgomaster-gulls of the island. A feeling of compassion filled our hearts as we viewed the scene of this grievous struggle against fearful odds. The dismembered bones of the ill-fated voyager were collected and a new grave and headstone made, and thereupon, in the Arctic stillness and under the light of the midnight sun, a simple burial service was read, after which we left the island, and turning our faces northward invoked better tides and fortunes for ourselves and our friends at "Anniversary Lodge."

This sad duty to a fellow-wanderer like ourselves being fulfilled, we again proceeded northward. On July 25th, the day indicated in the official prospectus of the expedition as the date of arrival, we reached the neighborhood of Lieutenant Peary's headquarters, only to find that the ice had not yet broken up in Inglefield Gulf and that thirty-five miles still intervened between us and our destination. Had the condition of the ice permitted, we could easily have made a sledge trip for the remaining distance; but while compact enough to prevent the advance of the ship, the ice in places showed the effect of tidal action in the shape of open "leads" and pools of water. These effectually cut off our advance towards the Peary headquarters.



ESKIMO VISITORS FROM IGLOO D'HOMINY.
The Most Northern Settlement

On the shore of Robertson's Bay, almost due north of our position at that time, was located the small village of Igloo d' Hominey, which may be regarded as the most northerly permanent settlement of human beings on the globe. The day following our arrival, five natives from this place came across the bay ice on their dog sledges to visit the ship, and we learned from Meuh, their spokesman, that the Peary party were all well, and, furthermore, that in his opinion, their quarters could be reached in "two sleeps." Realizing the importance of opening up communication with Lieutenant Peary at the earliest possible moment I determined to undertake a journey to his headquarters at once. On the afternoon of July 26th, therefore, in company with Mr. Diebitsch and a native guide, I left the ship for Igloo d' Hominey en route for "Anniversary Lodge." We availed ourselves of the Eskimo dogs and sledges at hand and in this way were able to carry four days' provisions, sleeping bags and a few other necessities for the journey. From my knowledge of the neighborhood, gained on a previous visit as a member of the Peary Relief Expedition of 1892, I deemed it possible to proceed along the ice foot of McCormick Bay to the head thereof, whence, by a route used by the natives, a short cut could be made over the glacier from the head of McCormick Bay to the head of Bowdoin Bay—the site of the Peary headquarters.

But the sequel proved that our guide—the veteran Meeuh—had greatly underestimated the difficulties of travel at this unsettled season of the year, when neither the conditions of winter nor of summer prevailed. After an absence of four days, during which we encountered fog and storm and baffling "leads" of open water, our guide refused to accompany us further over the loose and rotten ice, and we were compelled to return to the ship. The day following our return the "Falcon" again attacked the ice, hoping to reach a "lead" which opened up in the desired direction. By means of continuous ramming and butting and the occasional use of blasting powder when the floes pressed us too closely, we finally reached open water, and, by following the narrow and tortuous passages between the ice fields, were able to advance about five miles up Inglefield Gulf, to the edge of the

unbroken winter floe. We were now in sight of the settlement of Karnah, whose inhabitants, old and young, straightway forsook all other pursuits and lost no time in reaching the wonderful "Oomiaksoak," where they were sure of a kind reception and a great feed at the hands of Larry Hackett, our kind-hearted steward. A reward had been offered by Mr. Peary for the first news of the ship's arrival, and the welcome tidings were first carried to "Anniversary Lodge" by two native couriers on the evening of July 31st. Lieutenant Peary dispatched Mr. Entrikin to the ship in company with the two enterprising Eskimos, the same evening, and thus it happened that early on the morning of August 1st the cry of "Kablunah" (white man) raised by the natives, brought me on deck in time to grasp the hand of Mr. Entrikin as he clambered over the ship's side.

Great was our regret to learn from him of the failure of Mr. Peary's sledge journey on the inland ice and the consequent postponement of its execution until the following year. After a very brief delay, Mr. Entrikin announced that he was ready to return to headquarters, and, accompanied by Mr. Diebitsch, and drawn by the two identical dog teams which had already twice made the thirty mile journey within twenty-four hours, we set out for "Anniversary Lodge." I doubt if anywhere on the globe there assembled that evening a happier company than the one which greeted our arrival at Falcon Harbor in front of "the Lodge." Lieutenant Peary was gratified to find his relief steamer reporting on time, Mrs. Peary delighted to find I had brought with me her brother, Mr. Emil Diebitsch, and the others glad to welcome new faces to their camp and to receive letters from family and friends. In due time, we were presented to the new member of the North Greenland Expedition, Miss Marie Anig-heto Peary, whose little life had grown and blossomed into loveliness under the rays of the North Star as other children's lives had grown amid the comforts of more genial climes.

After a conference with Lieutenant Peary, it was decided to carry out the prearranged programme of the expedition and to visit Ellesmere Land to continue our search for traces of the lost Swedes and also to attempt the exploration of the north shore of

Jones Sound. Leaving Professor Chamberlin to pursue his studies of the glaciers about Bowdoin Bay, the Auxiliary Expedition, reinforced by the presence of Messrs. Astrup, Entriikin, Vincent, Carr, Davidson and Swain, of the Peary party, started on August 4th for Cape Faraday, Ellesmere Land. After thirty-six hours struggle with the ice in Murchison Sound, the open water of Baffin Bay was reached, and on August 7th we succeeded in pushing our way through the belt of ice which impinges the east coast of Ellesmere Land and succeeded in landing at Cape Faraday, being, as far as I can learn, the first party of white men to land on the west coast of Baffin Bay between Jones Sound and Smith Sound.³ No trace of the lost explorers was found here, nor at Clarence Head—a bold headland to the south, where in company with Professor Libbey and Messrs. Astrup and Diebitsch I went ashore on August 8. Before returning to the ship, cairns were built on prominent points at both places in which records of our visit were placed. The assertion of the whaling captain that this west coast is unapproachable during ten months of the year, owing to the field of ice which extends twenty miles from shore, seemed to be verified by the experiences of our party. Although we arrived in the height of the Arctic summer we could not force the “Falcon” nearer than eight miles from shore and were compelled to make the remaining distance on foot at considerable risk over the shifting ice.

Had the unfortunate travelers ever succeeded in landing at Cape Faraday or Clarence Head their position would have been a desperate one. The entire coast line consists of a succession of precipitous headlands, crowned by the changeless snow-cap which discharges by numerous glaciers into the sea. No traces of

3. Clements R. Markham, P. R. G. S. in an address before the Royal Geographical Society, on May 28th, 1894, (*Geog. Journal*, vol. iv, p. 14) referring to the possibilities for original research in Ellesmere Land remarked: “• • • Next to Northern Greenland, the most interesting part of the unknown region is the land on the western side of the north part of Baffin Bay, between Smith Sound and Jones Sound, and extending along Jones Sound to the west and north. It was named Ellesmere Land by Sir Edward Inglefield, who saw it from the deck of the *Isabella* in 1852. It is called *Umingmak* (the land of the musk oxen) by the Eskimos. No one, so far as we know, has ever landed between Jones Sound and Smith Sound.”

game or of the recent presence of Eskimos were found,⁴ and, on leaving these desolate shores, we had the sad satisfaction of establishing the fact that the young Swedes never succeeded in reaching the western mainland.

The exploration of Jones Sound, with all its possibilities of original geographical research, was now before us. Finding Glacier Strait icebound we made our course through the pack ice south of Coburg Island into the sound. For six hours we steamed onward through open water, and hopes ran high of reaching new lands beyond Inglefield's farthest of 1852.

But after penetrating about forty miles the formidable unbroken ice of the previous winter rose up ahead, presenting an impassable barrier across the sound. It was a keen disappointment to be turned back thus on the threshold of the unknown; but, with no prospect of changed conditions, and with definite responsibilities ahead of us, protracted delay in these inland waters seemed unwarranted.

At noon on August 10th, observations showed our position to be: Lat. $76^{\circ} 14' 53''$ N., Long. $81^{\circ} 52' 36''$ W. Earlier in the day we had reached a point ten or fifteen miles west of this, where the solid floes extended across the sound. Holding our course to the northeast along the edge of the ice, we passed Cone Island at 4 P. M. This conspicuous landmark is apparently composed of red sandstone and rises in pyramidal outline directly from the ice-flecked waters of the sound.⁵

Wishing to again set foot on this land, which had promised such great rewards to our efforts, we steamed past Smith Island and headed our vessel towards a small bay on the adjacent north shore of the sound. After scrambling over the broken ice for two hours, we reached a smooth beach at the mouth of a small glacial valley. Rambling among the rocks where beds of scarlet

4. A few ancient Eskimo graves were found at Cape Faraday.

5. On August 17th, 1851, Lieutenant Sherrard Osborne in the "Pioneer" reached about the same position in Jones Sound and found like conditions prevailing, as he writes: "From a little beyond a conical shaped island on the north shore the sound was still barred with floes." Two of his officers landed on Cone Island and reported finding "numerous Esquimaux traces, though of very ancient date." (Stray leaves from an Arctic Journal, New York, 1852, p. 187.)



CONE ISLAND, NORTH SHORE OF JONES SOUND.



A MELVILLE BAY ICEBERG.

saxifrages smiled a welcome, we disturbed a few eider ducks feeding along the shore and sent two Arctic hares scampering up the hillsides. These were the only living things observed, although the skeletons of an ice bear and seal and numerous whale vertebrae were found imbedded in the sand near the beach. We were at a loss to account for the presence of these bones until the interesting discovery was made that we had lit upon the site of an Eskimo settlement. The foundations of eight igloos were found and a search amid the soil disclosed part of a bone sledge runner and the fragment of a lance head of the same material. These remains had every appearance of great age. The Eskimo hunter whom we had brought with us from Inglefield Gulf and who formed one of the landing party, vouchsafed no information regarding the former occupants of these moss-covered ruins.

This sheltered bay, being one of the few localities in this region adapted to the wants of a native settlement, may have afforded a temporary resting place to those Eskimos who wandering north eventually reached Grinnell Land and north Greenland. On the other hand, if we accept the statements of Bessels and Dr. Franz Boas⁶ that a primitive tribe of Eskimos inhabit the southwestern part of Ellesmere Land, it would be reasonable to suppose that members of this tribe in times past had extended their travels along the north shore of Jones Sound, as far east as the camp site referred to.

Directly after the return of the landing party we bore off to the southeast and in due time steamed out of the sound and passing

6. Dr. Frans Boas—The Central Eskimo. (An. Rep. Bu. Eth., 1884-85, p. 443.)—referring to the periodical journeys of one of the tribes of North Baffin Land, says: "The journeys of the Aggomuit are not at all confined to Baffin Land. In favorable winters they cross Lancaster Sound, passing the small island Uglirn, and winter on the eastern half of Tudjan (North Devon). While here they keep up some intercourse with the inhabitants of Unmingman Nuna (Ellesmere Land). . . . Having reached Unmingman Nuna, the Eskimo who gave me this information affirm that they fell in with a small tribe who resided on this shore. Here they lived for some time, as there was an abundance of seals during the whole year. Further northwest is a large fjord. . . . The Eskimos do not visit the land on the other side of this fjord, as bears are said to be very numerous and large there. Though these migrations to Jones Sound do not occur very frequently, they have by no means been discontinued."

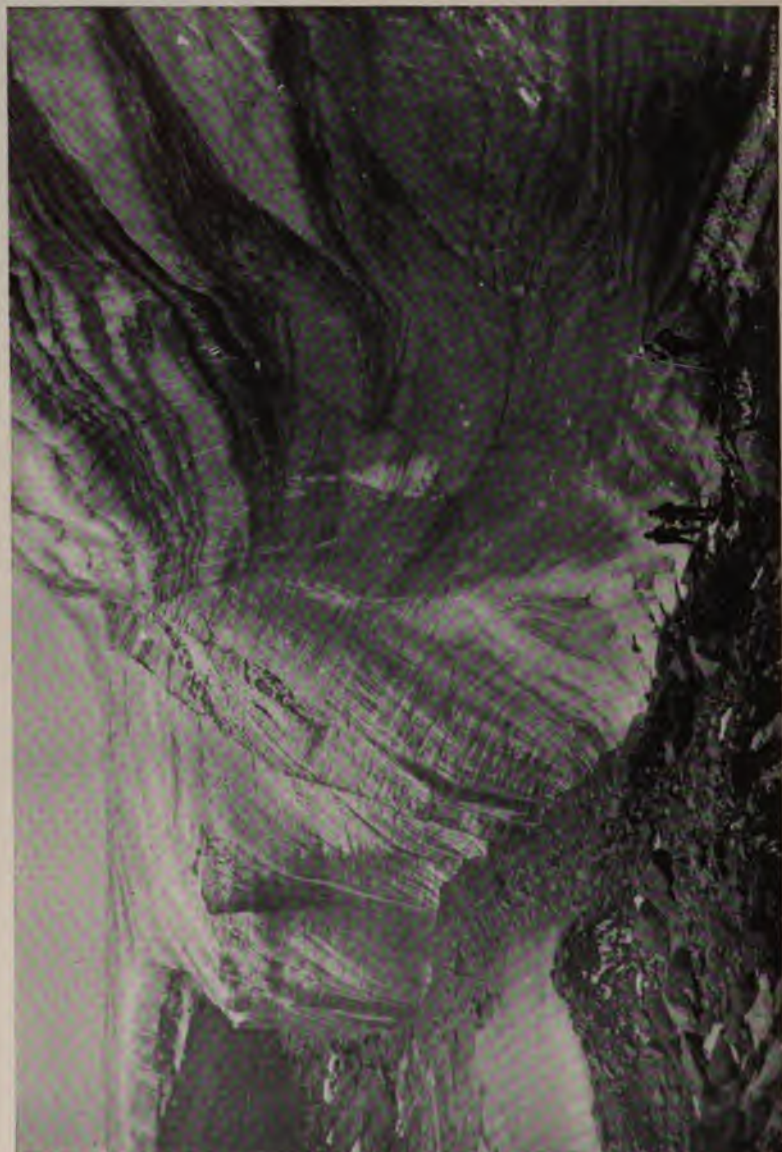
to the south of Cobourg Island made our course for Northumberland Island, where we arrived on the morning of August 13th.

Björling, in his record dated October 12, said that after the wreck of the "Ripple" he tried to reach Foulke Fiord to winter there, but "after reaching Northumberland Island, was compelled from several causes to give up this voyage and return to Cary Island." Thinking that possibly some traces of the presence of the Swedes might be found on this island, we skirted the south shore and landed at one point, but nothing was found to throw any further light on their movements.

After leaving Northumberland Island, we visited the native village of Netilume, on the mainland to the southeast, where some hours were spent in securing ethnological specimens, after which we again started for "Anniversary Lodge," 75 miles distant. But our old enemy, the solid bay ice, which baffled us so often during the summer so delayed our advance that it was seven days later (August 20th) before we cast anchor in Falcon Harbor, in front of "the Lodge." The continued firmness of the ice in the sounds and bays of this region was quite unprecedented according to the Eskimos, and added immeasurably to our difficulties. During the fifty days passed within the Arctic Circle, we had but ten days of clear open sailing. For twelve days we were diverted more or less from our course by heavy floe ice. For twenty-two days the "Falcon" was in the heavy pack, making but slow progress at best and stopped for days by the thick, unbroken floe of the past winter. During the remaining six days we were beset, first off Cape York and later on in Murchison Sound.

After our return from a hunting expedition to Academy Bay, in which the combined parties took part, final preparations were made for departure. On August 26th Mr. Frank W. Stokes and Mr. E. B. Baldwin, the artist and meteorologist, respectively, of the Peary party, came on board. Their companions of the previous winter, Dr. E. Vincent and Messrs. Astrup, Entrikin, Clark, Carr and Swain, had accompanied us to Jones Sound and were already established in their contracted quarters on the "Falcon." Last of all, Mrs. Peary and her infant daughter and Mrs. Cross,

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FACE OF THE TUKTOO GLACIER.

the nurse, came on board, together with "Miss Bill," a young Eskimo girl, whom it had been decided to bring to the United States. Hearty farewells were spoken to Mr. Hugh J. Lee, the member of Lieutenant Peary's party, who had volunteered to remain over another winter with him, and then our staunch old craft raised anchor and began her homeward voyage. Lieutenant Peary had decided to accompany us as far as Cape York, to superintend the shipping on board of a large meteorite, which had been located and examined by him on a sledge journey in the previous May. He is satisfied that this meteorite is identical with the historic "Souilic," or Iron Mountain referred to by the Arctic Highlanders who met Sir John Ross in 1818, as one of the two localities from which they obtained the iron for their knives.⁷ Arriving at Cape York on the evening of August 27th, the ice in Melville Bay to the eastward, where the meteorite was located, was found to be intact, thus putting an end to all our hopes of securing the specimen.

To expedite the return of Lieutenant Peary to his headquarters the "Falcon" again turned northward and carried the explorer as far as the Petowik Glacier. Arriving here the Lieutenant bade farewell to his devoted wife and infant daughter and clambered down into the whale boat, which with its crew of Matt Henson, the colored servant, and four Eskimos, was awaiting him. Decked out in all her bunting, a salute from her gun proclaimed the farewell of the "Falcon."

Erect and resolute in the stern of his small boat, Lieutenant Peary, in answer to the parting cheers from the ship, waved a farewell as the favoring wind bore him from our sight. A strange parting this—under the cold, gray sky of the Arctic—with the great glacier in the background.

Keeping in the open water of Melville Bay, we set our course for Godhavn, on Disco Island; a southeasterly gale drove us many miles from our course and we did not arrive there until September 2nd. Here we parted with Dr. Axel Ohlin, the Swedish member of our party, who availed himself of the invita-

7. *Arctic Manual*, p. 325.

tion of Inspector Anderson, to take passage to Copenhagen on one of the vessels of the Royal Greenland trading Company. Our last stop in Greenland was made at Godthaab, the capital of South Greenland, where the Danish officials extended every courtesy to us and where, during our two days' sojourn, we enjoyed the opportunity of observing many phases in the life of this happy but isolated community. Leaving Godthaab on September 8th, an uneventful voyage of seven days brought us once again to the familiar harbor of St. Johns and into touch with the great world beyond.

I have not referred at any length, in the foregoing pages, to the scientific work of the expedition. This phase of our enterprise was ever prosecuted when opportunity presented and the results have proved interesting and important.

A complete set of meteorological observations was taken daily during the voyage north of St. Johns and an unexampled series of photographs was secured by Prof. William Libbey, Jr., illustrating different features of the journey. I submit with pleasure to those interested in glacial studies, the geological report of Prof. T. C. Chamberlin, which embodies the results of his trained observations in the virgin field of the far north. Dr. Axel Ohlin, our Swedish member, with Professor Libbey's assistance, secured a collection of marine fauna notable in its variety and extent, as may be seen by consulting his preliminary report herewith appended.

The list of plants collected by our surgeon, Dr. H. E. Wetherill, and subsequently determined at the Gray Herbarium, of Harvard University, contains the first specimens collected in Ellesmere Land, which region may be regarded as "the connecting link between Arctic North America and Greenland." The capable services of Mr. Emil Diebitsch, our civil engineer, were ever at the command of the party, and were frequently employed in connection with the astronomical work of the expedition.

Mr. H. L. Bridgman forsook his journalistic duties in Brooklyn to make the northern voyage and has published an interesting series of letters in connection therewith.

As Lieutenant Peary has himself written of the expedition




Chief Steward Hackett.

Capt. Henry Bartlett.
1st Officer Tracey
Chief Eng. Fischer.

his own party during the winter of 1893-94 and the reasons for his want of success, I have not deemed it necessary to enter into these questions in this report.

The best wishes of all who are interested in Arctic achievement will attend the expedition which is soon to start for North Greenland to effect the return of the explorer and his companions. We trust it will prosperously accomplish its mission and bring back Lieutenant Peary crowned with the success which his devoted courage and sacrifice have so fully merited.

In conclusion it only remains for me to allude to one other subject: I refer to the sad fate which befell the "Falcon." The past season was one of exceptional severity in the north and the members of the Auxiliary Expedition look back on their experience as an almost constant battle with ice and storm. But through all these trials the "Falcon" came uninjured. After her arrival in Philadelphia the vessel was the object of some rather severe criticism, as a rough, untidy craft unfit for decent people to live on. Far different from this she appeared to the members of our party, as oftentimes, returning from some excursion we recognized her familiar outlines amid the ice floes. Needless to say, this feeling of affection accompanied her when she sailed from Philadelphia for St. Johns on the 3d of October, 1894. Since then nothing has been heard of her, and it is surmised that she encountered the hurricane which prevailed off the southern coast of Newfoundland between the 9th and 11th of October, and went down with all on board. On her return voyage she was heavily loaded with a cargo of coal, but should have made the run to St. Johns in eight days. When days, weeks and months passed without any intelligence being received, we were ultimately compelled to abandon all hopes of the safety of the ship and her crew. This sad disaster came home to all of us with unaffected grief when we considered that we had so recently parted from those gallant sailors with hopes of long life and happiness before them. Captain Bartlett was far above the average Newfoundland "Skipper" in intelligence and education, and his death



and the loss of his fourteen shipmates will long be remembered with sorrow in St. Johns.

In a signal tower, built high on the cliff which guards the entrance to the harbor of St. Johns, for many weeks the faithful watchman gazed out to sea ready to signal to the townspeople below the approach of the "Falcon." Sad and wishful eyes looked for many days for the message which came not. To the stricken widows and fatherless ones in St. Johns the members of that little company, which shared the fortunes of the good ship during the past summer, send their message of sympathy and express their desire to be numbered among the mourners of the "Falcon."

MR. HENRY G. BRYANT,

COMMANDER OF THE PEARY AUXILIARY

EXPEDITION OF 1894:

In cheerful compliance with your request, I have the pleasure of submitting herewith a synopsis of my observations as geologist to the Peary Auxiliary Expedition of 1894. Permit me to express my cordial appreciation of your hearty sympathy with my work, and your constant efforts to furnish all practicable facilities for it. Your solicitude and extreme care in everything pertaining to equipment and management contributed greatly to the safety and success of the investigations.

Very respectfully yours,

T. C. CHAMBERLIN.

University of Chicago, May 1, 1895.

APPENDIX A.

GEOLOGY.*

BY

PROF. T. C. CHAMBERLIN.

Typography of Greenland.

On our first approach to the coast of Greenland at Cape Desolation the rugose aspect of the coastal mountains arrested attention. The angularity of their sky-lines at once impressed itself, as well as the marked ruggedness of the whole topographic expression. Flowing contours were scarcely discernible in the general view. Here and there they might be found by search among the lower contours, but they contributed little to the general expression. In addition to the asperity of the profiles, it was observed that the dominant lines of sculpture lay in vertical planes. It was quite obvious that their fashioning was due to the familiar meteoric agencies that work vertically. These features would not have been remarkable on almost any other coast, but here they possessed special significance. It has been the view of some geologists that the former glaciation of the American mainland, which covered some three million square miles and reached southward approximately to the Ohio and Missouri Rivers, was but an extension of the present ice-cap of Greenland. If this were so, the interior ice of Greenland must once have pushed out to the coast across the border mountains and thence onward some 2000 or more miles. Such an extension would obviously have resulted in much horizontal rasping of the border mountains as the ice pushed across them. The unsubdued angularity they presented appeared to signify either that this hypothesis is en-

*For permission to reproduce the accompanying illustrations, the author acknowledges his indebtedness to the editor of the "Bulletin of the Geological Society of America."

tirely untrue, or that the advance of the ice was so ancient that the mountains have since recovered their angularity by meteoric degradation. The importance, therefore, of studying the entire coast line which we were to traverse, with a view to determining whether this angularity was a general feature or not, was fully appreciated, and observations were continued assiduously throughout the whole trip, going and coming, so far as the conditions of the voyage permitted. The interruptions due to fog and darkness were considerable, but out of the something more than 1100 miles of coast skirted, a sufficient proportion was observed to justify drawing inferences with a fair degree of assurance.

It was found that the angularity was not a universal feature but that it alternated with very considerable tracts of flowing outlines of glaciated aspect. All of the topography that was seen during the first and second days of our coasting was of the angular type. On the morning of the third day we found ourselves opposite a very pronounced transition. The coast southward was strongly serrate; that to the northward was as notably fluent. The latter type extended northward so far as could be seen during the forenoon of third day, but observation was much interrupted by fogs and was entirely cut off during the afternoon. So much of the coast as was seen during the following day, southward from Disco Island, was of a similar flowing type, in the main, but not altogether. The western projection of the Narsarsuaq Peninsula is of the rounded type. From Svarten Huk to the Devil's Thumb, north of Upernavik, a portion of the contour is serrate, while other parts are subdued. There is no marked predominance of either class. The coast of Melville Bay is largely formed by the edge of the inland ice, which here comes down to the sea. The remainder is formed by promontories jutting out from the ice sheet like dormer windows, or by peaks projecting like islands through the great sheet of ice. The Devil's Thumb and Melville Monument are rather slender rock columns, standing but a few miles off the border of the present inland ice sheet.

From Cape York northward to Inglefield Gulf, subdued co



FIGURE 1.—DALRYMPLE ISLAND, NEAR THE GREENLAND COAST.
Showing unglaciated profile.



FIGURE 2.—SOUTHEASTERN CAREY ISLAND.

This island is about thirty miles west-northwest of Dalrymple island. The view shows glacial contour produced by movement from the north; not from adjacent coast of Greenland. The geologic structure of Dalrymple and Carey islands is almost identical, the difference in contours being apparently due wholly to glaciation.

The schooner "Ripple," belonging to the Swedish Travelers Bioring and Kallstenius, was wrecked on this island August 17, 1892. From here the four surviving members of the party started, October 12, on the boat journey to Ellesmere Land, in the course of which they lost their lives.

DALRYMPLE AND CAREY ISLANDS.

tours prevail over rugged ones; the latter, however, are not entirely absent on the immediate line of the coast. Two very notable features are formed by Conical Island and Dalrymple Rock. Both of these are sharply conical masses of rock rising from the sea a short distance off the coast. Their steep sides are rugged and rise symmetrically to sharp peaks. They exhibit no evidences of horizontal rasping by glaciers. On the contrary, they seem to stand as conspicuous monuments of their absence. Dalrymple Rock is famous as the nesting place of eider-down ducks. Its selection by them is obviously due to the roughness of its surface, which affords appropriate niches for their nests. Quite in contrast with the rugose surfaces of Conical and Dalrymple Rocks are the Cary Islands, which lie in the midst of the bay, 30 or 40 miles from the coast. These present rounded contours which find a ready explanation in the glacial groovings on the summit of the southeastern island. The evidence of the striae is supported by erratics of limestone, sandstone and other clastic rocks found on the summits of the islands 500 feet above the sea, but yet altogether foreign. The striae show a glacial movement from the north, and this, together with the known distribution of Paleozoic rock similar to the erratics in that quarter, justifies inference that the glacier which rounded the contours of the Cary Islands, but left Dalrymple and Conical Rocks unaffected, came from Smith's Sound and beyond.

In summation it may be said that about one-half of the western coast of Greenland, between Cape Desolation and Inglefield Gulf, a stretch of some 17 degrees of latitude, presents angular and apparently unglaciated contours, while the remaining half presents subdued outlines apparently indicating former glaciation. This interpretation is supported by the observation that some of the rounded contours were actually glaciated, as shown by striae and erratics, and, on the other hand, by the fact that on Bowdoin Bay, a dependence of Inglefield Gulf, a small driftless area was found indicating that the former glaciation of Greenland was, there at least, very narrowly limited.

The impression has been very generally conveyed by writers upon Greenland that the coastal belt is mountainous. This is alto-

gether justified, so far as the territory south of Melville Bay is concerned, but it is quite worthy of special note, in view of its importance to glacial investigations, that north of Melville Bay the border tract is a plateau, only here and there accentuated in a mountainous fashion. In the region of Inglefield Gulf the plateau is very pronounced and nothing really mountainous is presented. This plateau is about 2000 feet in height, varying through a moderate range above and below this. The undulations of its summit rarely reach a thousand feet, and they have the characteristics of a rolling or hilly plain, rather than of mountainous corrugation. The rise from the sea level is in part precipitous, due doubtless to coastal encroachment, but in larger part perhaps it is sloping and traversible in almost all directions. Upon the plain of this plateau the interior ice spreads itself out with little interruption, except as valleys descending from the summit to the sea level draw out tongues from it. About half of these reach the water, while the other half terminate on the land.

It is very possible that this plateau is but the outer edge of a very extensive and elevated plain underlying the interior of Greenland. Many students of Greenlandic phenomena have suggested the existence of such a plateau in the interior on purely theoretical grounds. This view may fairly be thought to find support in the observation that in this northern region, along a tract of some hundreds of miles, such a plateau actually emerges from beneath the inland ice and forms the border of the island.

In addition to this upper plain, there is a lower one lying near the water's edge, which is worthy of attention, because of its historical significance, though it has but a meagre expression. It is very closely analogous to the plain skirting Norway and recently described by Dr. Reusch as constituting a new feature in the topography of that long-studied region.¹ The lower coastal plain of Greenland is well seen in the vicinity of Godthaab, the capital of the southern division. Here it constitutes an undulating peneplain abutting against a mountainous background. It descends gently toward Baffin Bay and its low undulations con-

1. Hans Reusch, *Journal of Geology*, May-June, 1894, pp. 347-349.

stitute the numerous small islands that fringe the coast. At many points it forms shoals and low islands, and is discernible even in the imperfect soundings shown on the coast charts of the region. Into this lower plain, the deeper channels along the coast, and the fiords in part, were excavated. The fiords, however, reach far back into the mountainous or upper plateau region.

Imperfect as my observations were necessarily, they seem to justify the suggestion that the history of the development of Greenland's topography embraced at least the following stages; quite possible it was much more complicated. The upper plateau appears to signify that at some former period, not very remote geologically, but certainly not very recent, the west coast of Greenland stood some 2000 feet lower than at present, and remained in that position during a period sufficiently long for the reduction of considerable tracts to a gradation plane, but apparently not long enough for the reduction of all the surface, for the bordering mountains of southern Greenland appear to be survivals. After this partial leveling of the island, it appears to have been elevated to an altitude not very different from the present and to have stood there long enough for the development of the coastal plain above described. Contemporaneously with this, the valleys doubtless extended themselves backward into the higher country. Later, a further elevation appears to have ensued to the extent of two or three thousand feet, during which the valleys were deepened and both the higher and lower plains considerably dissected upon their borders. Subsequent to this, the land sank to its present position, about which it is now obviously fluctuating, for there are evidences—among which are raised beaches and elevated shell deposits—that it has recently been elevated, and there are also evidences—among which are sunken ruins and forced migrations—that it has recently been sinking.

General Geology of the Region.

Subordinate to the main subject of study, the glaciation of the region, observations were made upon the preglacial geology as opportunity afforded. All that was seen in southern Greenland is but a confirmation of what has already become known through

the investigations of earlier observers. With the exception of the clastic and igneous deposits of the Disco province, the formations south of Cape York belong to an ancient crystalline series of the granitic or, more strictly, the gneissic type. These have usually been referred to the Archean age, and everything which I saw was confirmatory of the correctness of this reference, although, from the absence of any Paleozoic beds in contact with the series, the opinion rests chiefly upon the lithological character of the rocks themselves, their remote connections with the Paleozoic series of north Greenland and their general geographic relations to the terranes of the mainland.

In the region of Inglefield Gulf, the ancient crystalline rocks are bordered by sandstones and shales of unknown age. While the full extent of this clastic series could not be determined, even within the region visited, because it reached back under the ice cap, there were abundant grounds for the belief that it is but a narrow skirting belt. It was seen to be interrupted at frequent points by the coming of the crystalline series out to the shore. At other points, bays and valleys were observed to reach back across the clastic belt to the crystalline series behind. At other points where the clastic series occupies the whole coast and forms the front of the plateau, the glacial tongues brought crystalline rocks from beyond, and this is true in the case of Redcliffe Peninsula, whose ice cap is entirely separate from the inland ice and whose diameter is but about 15 miles. It is obvious from this and similar cases, that the crystalline rocks rise to the summit of the plateau within a few miles of the coast.

The clastic series embraces three distinguishable members. The lowest is a red sandstone which attains a thickness of perhaps 1000 to 1500 feet. Its beds possess moderate massiveness, lie at low inclinations, and rest unconformably upon the crystalline series. The discordance is very great and indicates that the crystalline terrane had assumed essentially its present attitude, had undergone very great erosion, and had approached its present topographic expression before the sandstone series was laid down upon it. If the sandstone were removed, the relief of the

topography would apparently not be less than it is now, and not very different from it in general aspect.

Lying conformably upon the red sandstone is a somewhat thicker series of pinkish gray sandstone. This has a quartzose constitution much the same as that below but somewhat exceeding it in hardness. While well indurated, it is unmetamorphosed. Under glacial action it manifests its endurance very markedly and constitutes, in favorable situations, a very notable constituent of the drift. Its thickness was roughly estimated at 1500 to 2000 feet.

Reposing conformably upon the pinkish gray sandstone lies a deep series of more thin-bedded sandstones and shales of reddish-brown and dark hues. The sandstones, which predominate over the shales, are less heavily bedded than the series below. They manifest a marked disposition to split up into thin slabs under exposure, and hence degradation proceeds with much facility. Interstratified with the sandstones there are shaly beds of kindred constitution which were obviously once only the more muddy sands of the accumulating sediments. Besides these sandy shales there is found on the south side of Redcliffe Peninsula a very notable horizon of finely leaved shales of dark color which disintegrate with great readiness into a soft talus of leaflets. These more pronounced shales do not, however, appear to be sharply differentiated from the common sandstone and shale series, but possibly a more thorough study of the region would find grounds for separation. The thickness of the whole series can only be vaguely estimated from such cursory observations as I was able to make, but I should judge that it exceeds rather than falls below the estimate of the preceding series. No careful measurements of the thickness of any of these series were made, and the figures given are general estimates that will be serviceable only in giving an approximate idea of the massiveness of these formations.

The conformity of the three sandstone series among themselves suggests that there may be no vital distinction between them and that they represent a consecutive sedimentation reaching a total thickness of four or five thousand feet perhaps.

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and the loss of his fourteen shipmates will long be remembered with sorrow in St. Johns.

In a signal tower, built high on the cliff which guards the entrance to the harbor of St. Johns, for many weeks the faithful watchman gazed out to sea ready to signal to the townspeople below the approach of the "Falcon." Sad and wishful eyes looked for many days for the message which came not. To the stricken widows and fatherless ones in St. Johns the members of that little company, which shared the fortunes of the good ship during the past summer, send their message of sympathy and express their desire to be numbered among the mourners of the "Falcon."

MR. HENRY G. BRYANT,

COMMANDER OF THE PEARY AUXILIARY

EXPEDITION OF 1894:

In cheerful compliance with your request, I have the pleasure of submitting herewith a synopsis of my observations as geologist to the Peary Auxiliary Expedition of 1894. Permit me to express my cordial appreciation of your hearty sympathy with my work, and your constant efforts to furnish all practicable facilities for it. Your solicitude and extreme care in everything pertaining to equipment and management contributed greatly to the safety and success of the investigations.

Very respectfully yours,

T. C. CHAMBERLIN.

University of Chicago, May 1, 1895.

APPENDIX A.

GEOLOGY.*

BY

PROF. T. C. CHAMBERLIN.

Typography of Greenland.

On our first approach to the coast of Greenland at Cape Desolation the rugose aspect of the coastal mountains arrested attention. The angularity of their sky-lines at once impressed itself, as well as the marked ruggedness of the whole topographic expression. Flowing contours were scarcely discernible in the general view. Here and there they might be found by search among the lower contours, but they contributed little to the general expression. In addition to the asperity of the profiles, it was observed that the dominant lines of sculpture lay in vertical planes. It was quite obvious that their fashioning was due to the familiar meteoric agencies that work vertically. These features would not have been remarkable on almost any other coast, but here they possessed special significance. It has been the view of some geologists that the former glaciation of the American mainland, which covered some three million square miles and reached southward approximately to the Ohio and Missouri Rivers, was but an extension of the present ice-cap of Greenland. If this were so, the interior ice of Greenland must once have pushed out to the coast across the border mountains and thence onward some 2000 or more miles. Such an extension would obviously have resulted in much horizontal rasping of the border mountains as the ice pushed across them. The unsubdued angularity they presented appeared to signify either that this hypothesis is en-

*For permission to reproduce the accompanying illustrations, the author acknowledges his indebtedness to the editor of the "Bulletin of the Geological Society of America."

mountains. In the former case, a nearly horizontal sheet is formed which spreads outwards and gives rise to tongues when the expanding border encounters valleys leading down from the little plateau to the lower lands or the sea. Thus the tongues radiate from the parent mass. The motion is centrifugal. In the other case, the snows and ice gather from the amphitheatres and gulches into a common trunk, much as the water of a collecting area gathers into a river. The movement is concentrative. The upper ice streams gather into a lower trunk stream. In some respects, therefore, the habit of the true Alpine glacier is the opposite of that of the local ice-cap. Notwithstanding this notable difference, the two forms grade toward each other, and may possibly grade into each other. Where several Alpine glaciers collect on the several sides of a mountain, they jointly have a radiant movement. If their amphitheatres are conjoined, they approach the type of the ice-cap. If the summit of the mountain is broad and smooth, so as to permit a general snow covering, there may be a graduation of the one type into the other.

The frequency of occurrence of local ice-caps on little plateaus between the inland ice and the sea is quite notable, and is not without importance as a factor in glacial study, for these local ice-caps define more sharply than the great inland sheet, the limitations of glacial accumulation. They enable us to observe quite accurately what elevations (combined with other conditions) are adequate to produce glaciation, and where the limit of adequacy is reached. So also, elevations being equated, they furnish the means for estimating the influence of meteoric conditions. In the case of the great ice-cap it is difficult to determine how far the protrusion of the ice upon the borderlands is due to local conditions, and how far to influences derived from the distant interior.

USE OF TERMS. The prevalence of ice-caps in Greenland has led to a special usage of glacial terms. The title glacier is usually applied simply to the ice tongues that protrude from the inland ice or from some local ice-cap. It is also applied to distinct portions of the border of the ice-cap, particularly such as come down to the sea, even though they protrude but little, or

none at all. The ice sheet with which these tongues or sea walls are connected and which really makes up the great mass of the glacier is usually spoken of under the phrase ice-cap. If the great ice-cap is meant the common term is the inland ice. In Alpine regions the term glacier includes the entire stream of ice, though especially applied to the trunk stream to which the upper portions are tributary.

DISTRIBUTION OF WORK ON GLACIERS. Acceding to this convenient use of terms, it may be serviceable to indicate at this point the distribution of my studies, as it will be impracticable in this synoptical report to describe the glaciers in detail. On the Island of Disco three glaciers were examined. They arise from a small ice-cap which occupies the plateau of the southwestern portion of Disco Island. From this they descend into Blaese Dael, but do not reach the sea. They have been elsewhere designated the Lower, the Middle and the Upper Blaese Dael Glaciers,³ respectively, according to their position in the valley. In the Inglefield Gulf region, my examinations embraced fourteen glaciers, the border of the main ice-cap and of the ice-cap of Redcliffe Peninsula. Of the fourteen glaciers, the Igloodahomyne, the Bowdoin, the Tuktoo, the East Branch, the Mirror, the Gable, the Hubbard and the Leidy Glaciers originate in the main ice-cap, indeed they are mere short tongues or lobes of it. Of these, the Bowdoin, the Hubbard and the Leidy reach the sea; the others do not. The Fan, the Bryant, the South Point, the Gnome and the Krakokta Glaciers radiate from the ice-cap of Redcliffe Peninsula. None of these reach the sea level. The first two flow southward, the next two eastward and the last northward, affording opportunities for a study of the meridional aspects of glaciers of a common source and similar dimensions, and these I was able to compare with the observations of Lieutenant Peary on those which descend on the west side. The East glacier, though immediately adjacent to the border of the inland ice, appears to have an ice-cap of its own on the summit of a small dissevered portion of the plateau. Glacial geologists

3. *Journal of Geology*, November-December, 1894, pp. 775 to 788.

will appreciate the advantages of selecting so large a proportion of glaciers that terminated on the land, in a study whose chief object was light upon glacial deposits, rather than upon glacial physics, and also of selecting short lobes of the inland ice, which were practically the border of the ice-cap itself, and more favorably exposed for study. The border of the inland ice between lobes was also studied. Lieutenant Peary was kind enough to conduct me out upon the inland ice far enough to afford a perfectly typical impression of its characteristics. Being entirely free from rock debris (except atmospherical dust) it did not call for prolonged study.

In addition to the immediate study of these glaciers, the general aspects of very many others were seen to greater or less advantage, by the aid of an excellent field glass, as we coasted past them, or were otherwise brought into their proximity. A very exceptional opportunity of observing the frontal contours of the inland ice was offered during the inner passage of Melville Bay in the course of which we skirted its remarkable frontage through almost its entire distance.

As the limits of this report preclude detailed description, it may be convenient to throw the seventeen glaciers visited into two classes, which may be designated the southern type and the northern type.

THE SOUTHERN GLACIAL TYPE. It is well known to all students of the subject that the glaciers of southern latitudes end in a slope of moderate declivity. The glacier disappears by a rapid thinning at its edge, due chiefly to progressive surface melting. This habit was found to prevail with all glaciers seen on Disco Island, not simply those which were visited, but the others which were seen at greater or less distances. The same was true of those seen distantly farther south, and generally true even of those seen somewhat farther north.

THE NORTHERN GLACIAL TYPE. But in Inglefield Gulf, between the latitudes of 77 and 78 degrees, the prevailing habit is a marked departure from this. The glaciers end in ab-



FIGURE 3.—WEST FACE OF BRYANT GLACIER.

Showing vertical wall and stratification of the ice. The amount of debris is made to appear much greater than it really is by surface wash.



FIGURE 4. FRONT OF BRYANT GLACIER.

Showing vertical wall and stratification of the ice

BRYANT GLACIER.

rupt terminal walls, which rise to heights of 50 to 150 feet.⁴ Not only are the ends of the glacial tongues vertical, but in most instances the sides are so likewise. To some extent the edge of the ice-cap itself is vertical, though here a remarkable wind-drift border introduces a notable variation. The vertical walls face all points of the compass. It can scarcely be said that they do this indifferently, as only a few glaciers facing the north were visited; but these possessed a verticality altogether comparable to that of those which faced the east or west or south. There is little doubt that the cause of this is the low inclination of the sun's rays, and the fact that these are directed against the ice from all points of the compass in turn. Rays of low slant strike the back of the glacier at a very acute angle, and hence glance away with great facility and little effect. On the edge of the glacier, however, they strike much more normally and effectively, while in low latitudes the opposite is true. In addition to this, the slanting rays of the sun striking the surrounding earth's surface at low angles glance slightly upward and impinge upon the edge of the ice. In lower latitudes the rays strike the surrounding earth in a more nearly vertical direction and are thrown more directly back toward the sky. There are some instances in Inglefield Gulf where this verticality of margin does not obtain, but these are altogether subordinate in number and importance to the mural habit. In the report of Lieutenant Greely these vertical faces are not inaptly likened to the Chinese Wall.

The general phenomena observed in connection with the Disco glaciers and others of the southern type were in no way markedly different from the familiar phenomena of southern glaciers generally. There was little debris upon the surface. In the lower portion of the ice considerable rock material was embraced, and this to some extent appeared on the frontal slope at the extreme margin of the ice. It extended for a few rods back from the extreme edge, but did not in any notable way affect the upper surface of even the glacial tongues. No debris at all, except atmospheric deposits, was seen upon the ice-caps proper, either

4. It is scarcely necessary to say that I am here speaking of glaciers that end upon the land. Obviously those which reach the sea terminate in vertical walls through the breaking away of the ends.

north or south. Without therefore dwelling in detail upon the less unfamiliar features of the glaciers of the southern order,⁵ we may pass to the special characteristics exhibited by the northern type, as shown by the glaciers in the environs of Inglefield Gulf.

STRATIFICATION. The most impressive feature displayed by these glaciers is the pronounced stratification of the ice. The stratification of glaciers is not at all new, but the remarkable extent, definiteness and peculiar characteristics of the stratification displayed in the vertical walls of these northern glaciers amounts practically to a revelation. The ice is almost as distinctly bedded as sedimentary rock. On the vertical face there are usually presented two notable divisions, an upper one of nearly white ice, whose laminations are not conspicuous from lack of differential coloration, and a lower one discolored by debris, which gives great distinctness to the bedded structure. The lower division is divided by very numerous partings, along which are distributed rocky debris, embracing not only sand and silt, but rubble and boulders. Often the amount of this inter-spread debris is so slight as to constitute the merest film, while at other times it reaches a thickness of an inch or two, and sometimes it is distributed throughout several feet. In the last case, there is usually an intermixture of rock, rubbish and ice, but, in general, the rocky debris is arranged in very definite and limited horizons, leaving the ice above and below as clean and pure as any other. It is very notable and significant that the ice next the debris layers is the firmest and most perfect ice which the glacier affords. It fractures in a peculiarly vitreous fashion, and sends forth beautiful iridescent reflections from between the fracture faces. The coarser debris is arranged in the same horizons with the fine silt and clay. Often fragments several times as thick as the average silt layer will be centered upon it, projecting upwards and downwards into the ice on either hand. Where the ice is well laminated, as it very commonly is, the laminations bend under and over the embedded boulders, just as

5. These have been given in the *Journal of Geology*, November-December, 1894, pp. 768-788.



FIGURE 5.—EAST FACE OF BRYANT GLACIER.
Showing vertical wall and stratification of the ice.



FIGURE 6.—LOWER PART OF VERTICAL WALL OF GABLE GLACIER.
Showing inset debris, lamination, faulting and drag.

BRYANT AND GABLE GLACIERS.







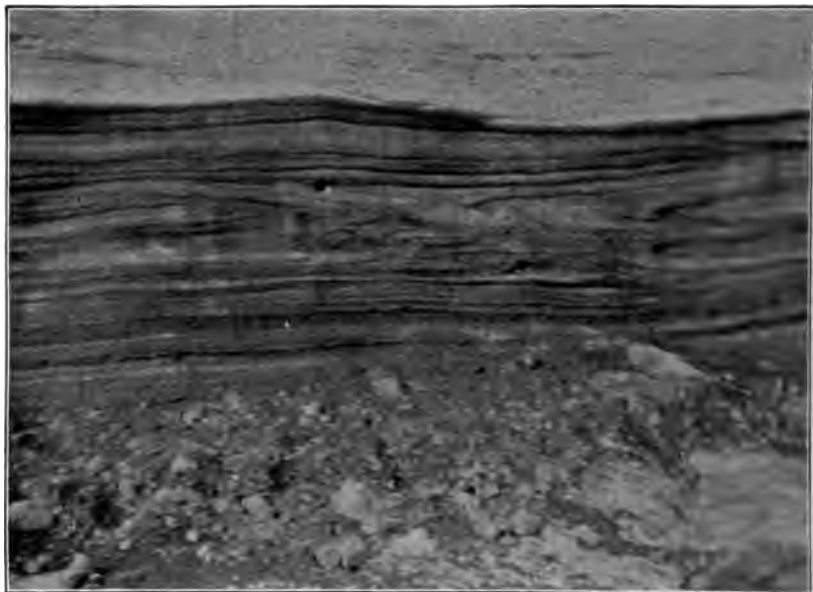


FIGURE 7.—LOWER PART OF PORTION OF EAST WALL OF BOWDOIN GLACIER.
Showing lamination, faulting, drag and overjutting of layers.



FIGURE 8.—A PORTION OF EAST FACE OF BOWDOIN GLACIER.
Showing an oblique upward thrust and distortion of laminae.

BOWDOIN GLACIER.

silt laminations are often seen to do in the case of embedded rock masses. This seems to indicate that the embedded bowlders do not descend through the ice by virtue of superior gravity, but are retained in the original position given them by the embedding process. The extent to which the basal portion of the ice is laminated is quite remarkable. In selected cases as many as twenty laminations might be counted to the inch. These laminae are sometimes very symmetrical, straight and parallel. At other times they are undulatory in varying degrees, while in some instances they are greatly curved and even contorted in an intricate fashion.

HEIGHT OF THE EMBEDDED DEBRIS IN THE GLACIAL BASE. In view of opinions that have prevailed to some extent relative to the rise of rocky material through a glacier, it is important to note the heights to which the embedded rock was found in the ice, and its behavior at the glacier's margin. The debris-bearing layers are found to be essentially parallel to the base of the glacier. This is very notably true in the larger view. Locally the layers rise and fall. Sometimes in the presence of obstacles they are thrust very notably upwards, and again in the lee of embossments they curve rapidly downwards and even in some instances are seen to be doubled upon themselves. On the whole, however, the ups and downs nearly balance each other, and the rocky material remains confined to the lower part of the glacier. In the main, debris is limited to the lower 50 or 75 feet. Sometimes the dirty layers prevail up to 100 feet and rarely beyond. I think that 150 feet might be named as a rather extreme limit. Even at the border of the glacier the clean, white layer of ice above the debris-bearing stratum usually constitutes one-third or more of the section. The view that the debris habitually works up to the surface and forms a layer upon it as it nears the border of the glacier is without support.

INTRODUCTION OF THE DEBRIS. The question of the method of introduction of the debris obviously becomes one of prime importance, not only on account of its interest in connection with the glaciers under study, but because of its appli-



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FIGURE 11.—PORTION OF EAST SIDE OF FAN GLACIER.

Showing behavior of the ice in passing over a low embossment of rock and drift. This figure shows only the upper portion, the next only the lower portion; the central part, of about equal length, not shown. Motion from right to left.



FIGURE 12.—PORTION OF EAST SIDE OF FAN GLACIER BELOW THE ABOVE.

Showing the curving down and bending back of the laminae in the ice of the embossment. The prominent dark line in the center turns back with a sharp curve a short distance beyond the limits of the view, and is apparently continuous with one of the bands shown very obscurely in the lower left-hand portion of the picture.

FAN GLACIER.

fold so formed would be elongated and appressed by the continuation of the process and become a layer. The ice, beneath, however, would gradually yield, and the debris layer would settle down out of the line of maximum thrust and the conditions for a new fold would be induced. There were several such appressed folds or intrusts on the slope of the embossment in question. In several cases in connection with other glaciers, very open folds were formed by the debris layers passing directly out into the ice in the lee of the embossment, and then gradually curving down and becoming reversed, apparently because the ice in the lee moved slower than that above. In some of these cases it was clear that the layer was formed by rubbing across the embossment or some protruding part of it, and that the folding was subsequent. So also there were cases of true faulting and overthrust, rocky debris being carried along the fault plane. The particular mode of intrust seems therefore to vary somewhat, but the general method is essentially the same. It is practically a process of overthrust, dependent on inequalities at the base of the ice.

METHOD OF MOVEMENT. The structure of the ice, as already described, appears to imply that the layers moved as units. The sharp definition between the clean ice and the debris layers, which was the common fact, indicates the absence, in the main, of that heterogeneous admixture of rock-rubbish and ice which might be expected if the ice moved as a liquid. The distribution of the dirt through the ice was very different from that of dirt through water when it is roiled by motion.

Several other considerations support the interpretation that the ice moved by layers, in part at least. On almost every one of the vertical faces certain layers were seen to jut out sharply above those beneath. Sometimes there were six, eight or ten of these projections one above another on the same face, the overset ranging from a few inches to a foot or two. In rare cases the overjutting reached ten or fifteen feet. At first sight this seemed a clear proof of the overthrust of the upper layer, but upon more critical study it was seen that there was usually earthy matter in the upper part of the under layer, or at the junc-

tion of the two, and it appeared possible that this, by catching the sunlight and melting back faster than the pure ice above, might explain some part or all of the phenomena, and suspicion arose that the inference of overthrust might be illusive. In following a given projection laterally it was seen sometimes to terminate where the earthy material ceased. To be sure, it might be supposed, with good reason, that the shearing of the ice and the intrusting of material were companion phenomena, and should naturally begin and end together. But none the less there was ground for hesitancy in trusting this class of evidence. In casting about for means of avoiding this possible source of error, the suggestion arose that pieces of rock lying at the junction of the layers would produce grooves or flutings if the upper layer were thrust forward faster than the lower one, and search was made for such groovings. It was found that the under surfaces of many of the projecting layers were fluted, and this, at first sight, seemed abundant confirmation of the hypothesis of overthrust. But here again, a more careful study made it quite certain that some of this fluting, indeed, much of it, as it was actually observed, was due to water trickling down the face of the overlying layer, which, instead of dropping freely away when it reached the edge of the projection, turned under and followed the lower surface backward, and in so doing fluted it. It may be that the fluting had been initiated by shearing, and was merely further developed by this backward running of the water, but in most cases I could not tell whether this was certainly so or not. Most of the projections were too high to be reached and critically examined. In searching for flutings that could not be attributed to water action, I found instances where the junction plane between the layers was marked by a layer of debris which was itself fluted. The earthy material was like a corrugated sheet passing backward from the edge between the layers of ice, the upper one of which projected over the lower.

Another class of evidence was derived from blocks of the stratified ice which had fallen from the face of the glaciers and had entered upon the initial stages of disintegration sufficiently to disclose the intimate nature of their mass. Glaciers are for



FIGURE 13.—PORTION OF SOUTHEAST FACE OF TUKTOO GLACIER.
Showing projection of the upper layers, apparently due to overthrust.



FIGURE 14.—PORTION OF SOUTHEAST FACE OF TUKTOO GLACIER.
Showing projection of the upper layers and the fluting of their under surfaces.

TUKTOO GLACIER.

the greater part made up of coarse granules of ice intimately interlocked. When these begin to undergo disintegration, the granules commence to separate from each other and the structure declares itself. Now in these fallen blocks it was observed that definite planes of parting were developed between some of the layers, while intermediate between these partings the interlocked granules held the crumbling mass together even after decay had made considerable progress. These partings were sometimes observed even when the layers were not separated by any earthy filament, the ice on both sides being white and pure. The plane of parting between the layers was often slightly gaping at the surface of the block, giving the impression that the two layers were peeling apart, though the effect was probably due in reality to superior melting along the junction plane. I found it easy by a moderate stroke of the spike of my alpenstock to split the blocks along these partings. The separated faces were smooth and strongly suggested an analogy to slicensides. That there had been motion of the one layer upon the other seemed practically beyond question. Between these partings the ice was so far bound together by the interlocking granules that an attempt to cleave the mass resulted in a fracture of the most ragged and irregular sort.

When we combine these evidences with what has already been stated regarding the intrusion and interstratification of the earthy material (and the inferences which this interstratification force upon us cannot lightly be escaped), it seems scarcely less than demonstrated that the glaciers move, in some notable part at least, by the sliding of one layer upon another. The bearing which this has upon fundamental theories respecting glacial movement is beyond the province of this report, but is obviously important.

RELATION OF THE GLACIERS TO THEIR DEBRIS.

The northern glaciers afford little that is new respecting lateral and medial moraines and they may be neglected. It has already been seen that much basal material is carried in the lower layers of the ice. It was also a matter of frequent observation that debris lies under the ice. Apparently the ice sometimes pushes



FIGURE 15.—PORTION OF LATERAL FACE OF EAST GLACIER.

Showing the perching of the glacier on its own debris, and the *gneiss-like* character of the laminae, due to the resistance of the mound of debris in front. The *overlapping* of certain upper layers is also shown. Bowdoin bay seen in the distance.



FIGURE 16.—PORTION OF EDGE OF THE ICE-CAP.

Showing upward curving of basal debris-bearing layers, due to the resistance of accumulations in front.

EAST GLACIER AND EDGE OF ICE-CAP.





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RATE OF MOVEMENT OF THE ICE. Though I went equipped with a full instrumental outfit for measuring glacial movements, the condition of the gulf ice made it necessary for me to leave this part of my equipment with the "Falcon" when I parted from it to go to Lieutenant Peary's headquarters. This would have been a subject of much greater regret had not Lieutenant Peary already commenced a series of observations upon the movements of glaciers of the Inglefield region, both by instruments and by photographs taken at intervals. It may not be inappropriate to quote for purposes of comparison a single result from his measurements. He found the daily movement of the Bowdoin Glacier, the most active in the vicinity of his headquarters, during the month of July to be four-tenths of a foot at the slowest point near the east border, and 2.78 feet at the fastest point near the centre, while the average for the whole breadth of the glacier was 1.89 feet. The movement of the majority of the glaciers of that region, particularly those that fail to reach the sea level is very much slower, indeed, in most cases, it is obviously exceedingly slow. While not permitted to make instrumental measurements, I took note of the ordinary signs of movement. In many cases these were found to be almost entirely absent. For instance, in front of the Fan Glacier there are cones of granular ice brought down by the streams which run upon the surface of the glacier. In addition to these, there are embankments of old snow soiled with earth, granulated, and half solidified into ice, as though at least a year old. These were found banked against the end of the glacier without any signs of movement on its part since their formation. As they leaned up against the terminal face to heights of thirty to forty feet, at least,



it is obvious that there had been no melting of the base at the extremity to counteract the effects of an advance had there been any. At the extremities of several other glaciers, phenomena of similar import were observed. The very firm impression was given by such physical signs that the average rate of movement of the glaciers of the region was very slow. At the head of the gulf, however, there are a few glaciers, among them notably the Heilprin, which produce large icebergs and which must therefore be wide departures from the prevailing slowness of motion. The difference in the rates of motion of different parts of the edge of the great ice-sheet are remarkable and must be carefully considered in forming an opinion respecting the average rate.

GLACIAL DRIFT ON ABANDONED TERRITORY.

The amount of drift on the territory once occupied, but now free from ice, is notable much more for its scantiness than its abundance. On Disco Island it was found to be very limited, except along the immediate fronts of the present glaciers. In the Inglefield district there are at some points very considerable accumulations of drift within a mile or two of the present ice-front, but at the same time much of the territory between the ice-front and the sea bears a very scant covering of drift. No great moraines were seen, nor any thick mantles of drift. The valleys in front of the glaciers are well floored with glacial wash, but even here the rock occasionally appears. Considerable delta-fans project into the gulf, but none of them exceed half a mile in depth.

Consonant with this scantiness of drift, the topography of the border-land shows only moderate evidence of glacial subjugation. It is mildly rounded, but not greatly molded.

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Deep gullies and ravines revealed the fact that the disintegration of the gneiss had extended to very considerable depths and had rendered it a soft, rotten mass which was not only easily crumbled, but was, to a considerable extent, even pliant and waxy under the fingers. It was possible to descend steep slopes by simply thrusting the heels deep into the softened mass. The coloration of the disintegrated material of this driftless tract was in harmony with its origin and in contrast with that of the drift-covered region about. The combined weight of all this evidence left no question whatsoever as to the verity of the driftlessness of the tract. The area was small, not exceeding three or four miles in maximum diameter. It lay between the edges of the ice-cap and Bowdoin Bay, and on ground whose average altitude was less than that of the glacier. A photograph taken from the moraine at the edge of the glacier and looking across the driftless area shows the ice of Bowdoin Bay in the perspective. It is clear, therefore, that its immunity from glaciation was not due to special elevation. It can only be attributed to the agencies inherently concerned in the growth and wastage of the glacier.

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this along and sometimes slides over it. At the end of the glacier the debris within the ice is freed by melting and accumulates as a talus slope. This sometimes protects the basal layers from melting and they become at length buried in the growing accumulation. Their subsequent melting gives rise to one form of kettle-holes, but only one form. It appeared from the stages presented by the several glaciers that where a lobe is slowly advancing the talus-slope gradually grows forward and constitutes an embankment upon which the glacier advances. It thereby grades up its own pathway in advance. On seeing this process one is at no loss to understand how ice can advance over fields of sand or soil without in any way disrupting them. It buries them before it advances upon them. A large number of the glaciers of the Inglefield region rest upon embankments or pedestals of this kind. Some that have recently retreated have left these causeways exposed to observation.

When the frontal material accumulates in a large mass, it opposes such a degree of resistance to the ice that its layers are curved upward on the inner slope, and if the glacier subsequently advances, the ice rides up over the moraine. Several such instances were observed, but none were seen where the ice showed any competency to push even its own debris, in notable quantity, in front of it. The ice is weaker than its moraines, as a whole.

WIND-DRIFT BORDER. There is a very notable wind-drift phenomenon connected with the border of the great ice-field of north Greenland, to which Lieutenant Peary was the first, I think, to call attention. The winds of the great ice-cap flow chiefly down its slopes as though by direct control of gravity. They carry great quantities of snow, and this lodges in the lee of the terminal moraine. The breadth of the fringing-drift thus formed reaches 2000 or 3000 feet in some cases and its slope rises from 100 to 250 feet, though a portion of this elevation is doubtless due to a slope of the earth's surface below. This snow remains from year to year and becomes solidified after the fashion of a glacier; indeed, it is little short of a peripheral ribbon-like glacier skirting the border of the great ice-cap. Between this and the ice-cap, as a narrow line of division, lies the termi-



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tegration of the gneiss of the driftless area. But this supposition seems highly improbable.

ARE THE GLACIERS ADVANCING OR RETREATING? Several glaciers on Herbert and Northumberland Islands showed evidences of retreat; the terrace-like pedestals which they had formerly built being in part abandoned. Some of the glacial lobes of the ice-caps showed, by fresh abandoned ground, a small retreat. Other glaciers showed by the presence of old moraines immediately in front that in the past they had been more extended than at present. These moraines may be a few hundred years old, but they offered no evidence of very great antiquity. One glacier was seen overriding its terminal moraine in one portion, while lying within it at another. This, taken in connection with the massiveness of the moraine, probably indicates that it has stood practically stationary for a considerable period.

Other glaciers were building sharp talus slopes in front, which probably means that they are very slowly advancing. But in one of the most marked cases of this kind, the South Point Glacier, it was clear that the border had been slightly more advanced in very recent times. The general inference was drawn that the fluctuations of the ice edge were as slight as the ice movement was slow.

APPENDIX B.

ZOÖLOGY.

Preliminary Report

BY

DR. AXEL OHLIN.

In the following brief notes I desire to enumerate the mammals and birds observed by the members of the expedition, and to give a brief account of the results of the work with the dredge and surface net. When the fishes and invertebrate animals collected by these methods are worked up, I hope to be able to contribute with a number of species to the knowledge of the fauna of Baffin Bay and Smith Sound—localities hitherto so little known.

As the main events of the expedition have already been fully described in the preceding pages of this report, I do not deem it necessary to make further reference to the objects or itinerary of our summer cruise in the Arctic. An intelligent understanding of our movements may be gained by consulting the accompanying maps (pages 151, 156), on which the route of our party is given.

Although no new species of mammals or birds were observed, it will be of interest, in connection with the subject of geographical distribution, to mention those observed in Davis Strait and Baffin Bay.

MAMMALS.

1. *VULPES LAGOPUS*.—Only one specimen of the Arctic fox was shot; this was secured at Academy Bay. From all we could learn, however, these foxes seem to be fairly numerous where the conditions are favorable for their existence, along the whole coast from Cape York to Humboldt Glacier.

2. *URSUS MARITIMUS*.—On our northward trip three specimens were obtained on July 19th, just beyond Sanderson's Hope, when we were approaching the pack-ice of Melville Bay. All were males.

The biggest one measured 8 feet 9 inches in length. The following day another was seen ; but we were unable to shoot it. In the floe-ice off Clarence Head, we succeeded in securing two polar-bears, and here, as well as at the entrance to Jones Sound, we observed several others. On our return, one old female and two cubs were shot from the vessel, not far from Cape York, on August 27th. In Inglefield Gulf the polar-bear is very rare ; no specimen was killed here during Peary's two expeditions. According to former observations it seems to be most common among the vast pack-ice fields of Melville Bay, and on the western side of the "northwater" of Baffin Bay. It is difficult to understand why it should be so rare on the Greenland coast north of Cape York, and it is difficult to give a satisfactory explanation of this fact, the supply of seals being here as good, or, perhaps, better than on the coast of Ellesmere Land. Probably, the Eskimos, whose remains are still to be seen at so many places along the whole coast of Grinnell and Ellesmere Land from the 82d degree of latitude to Lancaster Sound, have abandoned their old "igloos" on this shore just because the seals are less numerous here than on the east side of Smith Sound. One might expect that the polar-bear, whose food is mainly the same as that of the natives, would follow their example and move eastward ; but such does not seem to be the case.

3. *PHOCA HISPIDA*.—Although only one specimen was brought on board for examination, I have no doubt that this seal is the most common in Smith Sound and its northern continuation, and also that it is the most numerous species from Cape York to Cape Union, where it was observed during the Nares Expedition. Probably the seal called "pooshi" by the natives around Inglefield Gulf is identical with this species. In regard to the seals, it was unfortunate that we could procure but comparatively few specimens, although numbers of them were shot. The reason being that they sink immediately in the water when struck severely or killed by the ball. Even if met with on the ice and wounded, they were generally quick enough to jump into one of their blow-holes and disappear. In most cases, I was thus compelled to base the determination of the seals on the description I received from the members of Peary's Expedition, or from the Eskimos, as it was almost impossible to decide with any great degree of certainty to what species a seal head belonged which appeared for a few minutes above the water, and was observed at a considerable distance.

Therefore, my notes in reference to these animals are open to some

little criticism. Yet I am convinced that the seal most common in Inglefield Gulf next to the one just described is :

4. *PHOCA BARBATA*.—We did not obtain any specimen of these big and characteristic seals during our short summer trip, although they appeared frequently near the ship and at least one fine specimen was shot and nearly landed by a member of our party. We learned, however, that the bearded seal or "oogsook," as the natives call it, is not uncommon along the east side of this part of Baffin Bay and Smith Sound. Many individuals were killed last winter in Inglefield Gulf by Peary's companions. Here, as well as in the pack-ice off Cape York, we observed many seals which I am quite sure belonged to this species.

The third form of the genus *Phoca* which I consider quite common in Baffin Bay is

5. *PHOCA GRŒNLANDICA*.—The Greenland seal prefers, in these regions as well as in other seas which it frequents, the vast pack-ice fields far from the coast. On our northward trip in Melville Bay, and on our passage to Cary Islands, we saw many great herds of a seal belonging, without doubt, to the Jaen Mayen seal. We also met with the "harp seal," as this species is called by the Newfoundland sailors, in the pack-ice along the coast of Ellesmere Land from Cape Faraday into Jones Sound as far as we penetrated, *i. e.*, some few miles west from Cone Island in lat. $76^{\circ} 14' 53''$ N. and long. $81^{\circ} 52' 36''$ W.

6. *CYSTOPHORA CRISTATA*.—Although this large seal does not frequent Baffin Bay or Smith Sound, I mention it, because, on our northern trip to Disco, we killed five specimens, all of them being old males. We encountered the hooded seal in considerable numbers in the east Greenland ice or "stor-is," as it is termed by the Danes, which, as it is well known, floats with the cold Arctic current along the east Greenland coast through Denmark Strait, round Cape Farewell as far north as Holsteinsborg, in lat. 67° N. We entered this ice on July 12th, soon after sighting the Greenland coast, off Cape Desolation, in lat. $60^{\circ} 23'$ N., some miles northward from Cape Farewell. In this ice we steamed for two days, not very far from the coast, and everywhere we saw the "klapmyds" of the Norwegian whalers sleeping in the bright sunshine on the heavy ice-floes.

The question naturally suggests itself: How are these animals able to climb the high, steep walls of this ice, whose abrupt sides often rise six or seven feet from the surface of the sea? While on a Norwe-

gian whaler in the vicinity of Jaen Mayen in 1891, I sought in vain for a solution of this problem, a satisfactory explanation of which yet remains to be given.

7. *ODOBCENUS ROSMARUS*.—Walruses were seen by us in several places: as in Melville Bay in lat. $75^{\circ} 50'$ N. July 21st, and in the "northwater" of Baffin Bay on our passage from Wolstenholme Sound to Cary Islands July 24th, but in greatest number they were observed among the floe-ice in a little bay west of Cape Faraday. Here the vessel was accompanied by walrus-herds, each containing ten or twenty. It was a matter of some regret that the exigencies of the time did not permit us to capture any of these animals. The bottom of this bay was sandy and had a luxuriant vegetation of big *Laminaria* and *Fucus*, and I obtained here, in five fathoms water, *Mya* and *Glyptonotus* in considerable quantities. We were informed that the walrus or "awik" (Esk.) is very abundant in some favorable places in Inglefield Gulf, where it finds a rich supply of food in the shallow water. The winter food of the Eskimo dogs is, mainly, walrus meat and Lieutenant Peary provisioned his stock of dogs from the same source.

8. *LEPUS GLACIALIS*.—The Arctic hare is, besides the lemming, the terrestrial mammal which goes farthest north, its traces having been observed during Greely's Expedition, by Lockwood, in lat. $83^{\circ} 24'$ N. It was found by us at many places, *e. g.*, on the south coast of Ellesmere Land, at a cape opposite Smith Island, where we landed August 10th, and on Northumberland Island, where five individuals were shot. In some valleys around Inglefield Gulf its tracks were seen. The specimens killed were all quite white, except the tips of the ears, which had a black stripe about one inch long, and the under-side of the feet, the hairs of which had turned reddish-brown through rubbing.

9. *RANGIFER TARANDUS*.—The reindeer is very common in the valleys and high plateaus around Inglefield Gulf, and a sure proof of this is the fact that no less than 200 odd were killed last year by Lieutenant Peary's party, the expedition thus being supplied during the whole winter with fresh meat. Before starting south the "*Falcon*" visited the head of Inglefield Gulf, for the purpose of securing some reindeer meat and skins for Lieutenant Peary. Unfortunately, we only obtained four or five. The favorite feeding-places are valleys and the slopes of the mountains, which it ascends 1000 feet or more. I learned from Lieutenant Peary's companions that they had killed reindeers on

small "nunataks," situated some miles from the border of the inland-ice, this animal not hesitating to cross glaciers.

10. OVIBOS MOSCHATUS.—Although we did not meet with any of these interesting mammals, I put the musk-oxen on this list, seeing that several bones of it have been found in the neighborhood of Inglefield Gulf. As is well known, its geographical distribution is highly interesting; I do not think it is necessary to enter fully into this matter here. For further information I refer to the accounts of the Nares and Greely Expeditions. It is evident, however, that there is one problem in regard to the present range of the musk-ox which has not yet been fully explained. Its occurrence on the east coast of Greenland, first noted by the German expedition (1869-1870), and, recently, mentioned again by the Danes, is not strange, in view of the latest information from north Greenland. Peary and Astrup, on their sledge-journey, in 1892, to Independence Bay, in lat. $81^{\circ} 37' N.$, and long. $34^{\circ} 5' W.$, observed about twenty, some of which were killed. Thus, the way the musk-ox has taken to reach east Greenland is clear: From Grinnell Land, across Kennedy or Robeson Channel, he has wandered along the northern coast of Greenland, in the valleys of which he has found good feeding-places, as a comparatively rich vegetation covers the slopes of the mountains of Independence Bay, at the border of the inland-ice. R. Brown's opinion, that Greenland must end somewhere in lat. 82° or $83^{\circ} N.$, was thus verified by Peary's important discovery. Still, we cannot, in a satisfactory way, account for the disappearance of the musk-ox along the whole east side of Smith Sound, from lat. $82^{\circ} N.$, as far south as Wolstenholme Sound, on which coast his bones have been found by Nares' and Peary's Expeditions. Feilden,¹ the naturalist on board the "*Alert*," one of Nares' ships, believes that the Eskimos exterminated them; "for, I imagine, few animals are less fitted to elude the wiles of the hunter."² Still, he says on the next page: "When thoroughly frightened they take to the hills, ascending precipitous slopes, and scaling rocks with great agility." This seems to be somewhat contradictory. Other travelers refer to the danger of hunting the musk-ox, and tell how furiously the old bulls attack the hunter if he fires at the herd. It is difficult to determine the

¹ G. S. Nares. "A Narrative of a Voyage to the Polar Sea," etc. London, 1878. Vol. II, p. 199.

² *Ib.*, p. 200.

facts in the case, but I venture to say that the Eskimos cannot kill the musk-oxen easier than they do the reindeer. The latter animals are very numerous, although they have been hunted by the Eskimos for many years in the same localities where the musk-ox has now totally disappeared. Perhaps the disappearance of the musk-ox can be accounted for by its competition with the reindeer for the scarce vegetation, which is barely sufficient to supply ONE large herbivorous animal with food. The explanation of the fact is, in any case, very difficult, and in trying to solve this problem, as well as the one I mentioned regarding the polar-bear, I think we have to count with factors not yet appreciated by former authors, and still fully unknown.

11. *BALCENOPTERA MUSCULUS*.—During our stay at Godhavn on the northward trip, the Eskimos sighted far out to sea the floating body of a big whale. Then "*Falcon*" steamed out and brought the carcass into the harbor. It belonged to the above species. North from Disco Island I did not observe any right, or fin-whales, but on my return to Denmark, I saw fin-whales several times; the determination of the species being impossible, it is unnecessary to enumerate the localities.

12. *HYPEROODON ROSTRATUS*.—When cruising in the east Greenland pack-ice off Fredrikshaab I saw some bottlenoses among the ice. As I have intimated once before,³ this whale and, probably, all the others except a very few, are not dependent in their distribution on the temperature of the water, as formerly was believed by many authors. In Baffin Bay or Smith Sound we did not observe the bottlenose.

13. *BELUGA LEUCAS*. "*Kaja-gaktoo*" (Esk.).—The white whales seem to be very numerous in Inglefield Gulf and on the Greenland side of Baffin Bay. Many times, when trying to get through the ice in Murchison Sound and Bowdoin Bay, we had the opportunity to observe great schools, containing sometimes as many as a hundred individuals, swimming and blowing quite near the vessel. The weather being fine, I observed during one week of August nearly every evening the "white fishes" approaching the shore. Young and old were always going in the same school. I never heard any sounds from it, a characteristic noted by some authors.

14. *MONODON MONOCEROS*. "*Kell-el-looah*" (Esk.).—I believe the narwhal is also very abundant in Smith Sound and the "north-

³ Ohlin. "Some Remarks on the Bottlenose Whale (*Hyperoodon*)," in Kongl. Fysikografiska Sällskapets 1 Lund Handlingar, Bd. 4, Lund, 1893, p. 6.

water" of Baffin Bay, as we procured narwhal tusks in every Eskimo settlement we visited from Cape York to Inglefield Gulf. Several evenings in August I saw companies of this remarkable whale coming close to the ship showing but their marbled backs, but never their horns above the water. Yet the schools did not contain so great a number as those of the "beluga," and they seemed to keep more apart from each other. Like the white whales they were always to be seen in the clear strips of water or "leads" between the ice-floes. Farther south we did not meet with any. The narwhal, white whale and Greenland whale are probably the only real circumpolar whales. The natives when asked about the function of the tusks, had no explanation to give, and none of the views hitherto expressed can be accepted as entirely satisfactory on this point.

BIRDS.

Before enumerating the birds observed on the expedition, it may be well to remark that the small number of land birds observed may be accounted for by the rare opportunities we had to land, as we were almost continually on board the vessel or making excursions on the ice. We learned, however, that a few small birds of the orders *Passeres* and *Grallatores* were found living in the vicinity of Inglefield Gulf. However, I was not able to identify them from these descriptions; therefore I have enumerated here only the birds observed by myself; excluding those seen south of Cape Farewell, as they belong to the Atlantic Ocean.

1. *FALCO CANDICANS*.—I had an opportunity to see this magnificent bird only in Godhavn during the first week of September, when waiting for the Danish vessel. Lieutenant Peary's companions affirmed that they observed the Greenland falcon several times in Bowdoin Bay.

2. *PLECTROPHANES NIVALIS*.—When we arrived at Lieutenant Peary's headquarters, August 19th, I saw small flights of snow-buntings among the hills and rocks, which were covered with a scant vegetation of minute specimens of *Papaver nudicaule*, *Potentilla*, *Silene*, *Pyrola* and other plants. In Godhavn this little bird was very common.

3. *SAXICOLA CENANTHE*.—This bird I observed only once; it was in Godhavn, when stopping there on our northward trip.

4. *CORVUS CORAX*.—We shot one raven, July 24th, at Dalrymple Island, situated in the mouth of Wolstenholme Sound. At the

end of August also I observed some others at the entrance to Bowdoin Bay.

5. *LAGOPUS RUPESTRIS* is very common everywhere in Danish Greenland. Farther north I did not see any, but was informed by the natives that the ptarmigan frequents the coast of Inglefield Gulf.

6. *STERNA ARCTICA*.—Some specimens were observed in Murchison Sound and other parts of Inglefield Gulf. I do not think the Arctic tern is found breeding in great numbers in this region, as we saw but few of this species.

7. *PAGOPHILA EBURNEA*.—The ivory-gull I met with first during the journey, July 21st, in the pack-ice off Melville Bay. The only specimen obtained on our expedition was shot in Murchison Sound, July 26th. I did not see any others in Inglefield Gulf and I think it is rather rare here. During our stop off Clarence Head I saw three or four; but nowhere else on the coast of Ellesmere Land.

If one must consider the ivory-gull as very scarce in Baffin Bay, I suppose

8. *RISSA TRIDACTYLA* is the most common gull here as everywhere in the Arctic and north Atlantic seas. On our passages through Davis Strait and Baffin Bay, the ship was nearly always accompanied by the kittiwake, although I am rather inclined to believe, according to observations made by former expeditions, that it decreases in number the farther north one proceeds in Smith Sound.

9. *LARUS GLAUCUS*.—This big gull occurred nearly everywhere in Baffin Bay and Smith Sound. On Southeast Cary Island we found the glaucous gull breeding, but only a few pairs. It did not appear to be so numerous here as in Nova Zembla, Spitzbergen and other parts of the Arctic Ocean.

10. *LESTRIS PARASITICUS*.—The skua was to be seen on both sides of Baffin Bay and several times on our passages through Davis Strait, but never in great numbers.

11. *PROCELLARIA GLACIALIS*.—From the date of my leaving St. Johns, July 7th, until I came, on my return voyage, into the North Sea, lat. $58^{\circ} 24'$ N. and long. $2^{\circ} 5'$ E., I saw the fulmar nearly every day whilst sailing in open water. On the contrary, when the ship was nipped in the pack-ice of Melville Bay or Inglefield Gulf the fulmar was not to be observed at all or only represented by a few individuals. I noted the same fact in 1891 in the east Greenland ice around Jaen Mayen. The "mallemuck" does not seem to advance

any distance into the pack-ice fields as it always disappears on their borders.

12. *MORMOU ARCTICUS*.—This bird I saw only once in Davis Strait and Baffin Bay ; it was on our northward trip off Upernavik.

13. *MERGULUS ALLE*.—The little auk is very abundant among the ice-floes of Melville Bay and Baffin Bay. Never before have I seen this little bird in such countless numbers as here or in Inglefield Gulf. It would be difficult to estimate the number of thousands seen in one day only. The natives are very skillful in catching them. The flesh is a delicacy and the skins, with the feathers turned inwards, forms the winter undergarment of the Eskimos.

14. *URIA GRYLLE*.—The black guillemot or "sea-pigeon," as our sailors called this bird, was found nearly everywhere in the pack-ice of Baffin Bay and Smith Sound, although, of course, it did not equal in number the little auk or the following species.

15. *ALCA BRUENICHH* is very common on both sides of Baffin Bay. In the pack-ice of Melville Bay and Inglefield Gulf we had many chances to shoot the loons which frequented these waters in considerable quantities.

16. *SOMATERIA MOLLISSIMA*.—The eider-duck may be regarded as one of the most common birds along the whole coast from Disco Island to Inglefield Gulf. We shot it several times during the journey ; most successful were our hunters on our northward trip at Dalrymple Island, at the entrance to Wolstenholme Sound, where they killed eighty-seven, all females, in an hour and a half. I found a great many nests of this bird on Cary Islands and at many places in Inglefield Gulf. On the coast of Ellesmere Land the eider-duck was also to be found.

In regard to invertebrate animals I may remark, at the outset, that I had no opportunity to collect insects or spiders. Our botanist, Dr. Wetherill, surgeon of the expedition, had opportunities on his excursions to secure a few insects. These have been roughly classified by an American entomologist as follows—One *Bombus hyperboreus*, three *Tipula arctica*, four *Pediculi*, four spiders, one species of *Diptera*, two cocoons and three larvæ of *Bombycidae*.

The entire collection of marine fauna was brought by me to Sweden, and, having just finished a rough classification of the collection, it may be well to say a little by way of preliminary concerning it. Most of the marine animals were obtained by the dredge or the surface-net in Inglefield Gulf. I much regretted that I had no oppor-

tunity of dredging at other places, except in the harbor of Godhavn, and at Cape Faraday, the chief reason being that weather or ice did not permit it. Aside from the two above-mentioned stations, I had opportunities to dredge only in *five* places in Inglefield Gulf and Murchison Sound. On the map (pages 151, 156). I have marked these stations, together with the depths of the sea and the nature of the bottom.

As will appear on examination, I dredged in no water deeper than 50-60 fathoms. Therefore, we cannot expect to find true deep-sea forms among the collection; yet the result may be considered eminently satisfactory when the limited opportunities for work are considered.

On the whole, Inglefield Gulf must be considered very rich in animal life, which is, as I believe, to be accounted for, chiefly, by the great variety of the bottom within short distances. Especially favorable for highly interesting and numerous forms I found the bottom in front of the glaciers. In Murchison Sound I once used the little hand-dredge on muddy bottom in twenty-five fathoms of water—just where a river from a recedent glacier was flowing into the sea, the water being here for a considerable distance from the shore very brackish. I am convinced that the dredging on this occasion was the most successful one on the expedition, as regards both the number of the species and the individuals. In great quantities I obtained here four or five species of *amphipods*, *Mysis*, *Arcturus*, three or four of *palaemonids*, and some other crustaceans, three or four of *ophiurids*, *Antedon*, probably *A. Eschrichti*, *sea-stars*, some *gastropods* and *bivalves*, as *Leda* and *Yoldia*, *chætopods*, and other specimens not yet worked up. Rocky bottom, mixed with mud or sand, also proved to be very good. Among the crustaceans which here, as everywhere in the Arctic Sea, play a very important part in the animal life, three or four species of *crangonids* and some *palaemonids* were very numerous; besides these, *amphipods* came up in great numbers of species and individuals. *Fishes* were also caught in the dredge, mainly slow bottom-fishes, as *cottids* and *blenniids*. In no less number were dredged on this bottom *ascidians* and *polyzoa*, some characteristic *gastropods* and *bivalves*, *Strongylocentrotus Droebackiensis*, *ophiurids* and *Antedon*. More rarely occurred *Waldheimia*, a little *cephalopod*, probably *Rossia*, two *pyncogonids*, a *caprellid*, a few *sea-stars*, a big *lucernarid*, some *hydroids*, *Cyclopterus*, a *nemertin*, *Piscicola*, and *Myzostoma* on *Antedon*.

The only locality on the coast of Ellesmere Land where I had a chance to dredge was Cape Faraday. In five to seven fathoms water, and from a sandy bottom covered with a rich vegetation of *Laminaria* and *Fucus*, I obtained a few animals not before met with on the Greenland coast of Smith Sound: *e. g.* an *idotheid*, probably *Glyptonotus Sabinii*, two or three species of *gammarids*, and *Liparis*. On our northward trip I also took the opportunity to dredge in the harbor of Godhavn. The result was very poor, and the few forms obtained have, no doubt, already been described.

I used the surface-net at *six* stations during the voyage: in Davis Strait, off Fredrikshaab, in lat. 62° 30' N., July 13th; off Tasiusak, the most northern "udliggersted" of Danish Greenland, some miles north of Upernavik, July 19th; at Dalrymple Island, July 24th, and three times at different places in Inglefield Gulf. The result of the surface-gatherings off Tasiusak and Dalrymple Island was next to nothing; only some *dinoflagellats*, *diatoms*, *copepods* and other *entomostraca* were secured. On the contrary, off Fredrikshaab, the net was filled with *Limacina*, *copepods* and *ostracods*, *Zoea*- and *Myis*-stages of *decapods* in great quantities. Not so numerous were small *Clione*, *Cydippe*, *craspedote medusæ*, *Salpa*, a *hyperid*, *Ceratium* and *Appendicularia*.

The "plankton" of Inglefield Gulf was very rich. I found the evening to be the best time for using the surface-net; at that time and, probably, during the whole night, if I may use such a word for that part of the day when the sun is lowest on the horizon, innumerable masses of exquisite animals rise to the surface. We learned to expect the richest life near the places where the thousands of little auks were feeding on these organisms. In greatest profusion were *Clione* and *Limacina*, *copepods* and *ostracods*, four or five species of *ctenophors*, five of *craspedote medusæ*, one *hyperid*, two or three other *amphipods* and some larvæ of *decapods*. More seldom I observed in the plankton *Sagitta*, *palæmonids*, *schizopods*, a *polychæt*, two small *fishes*, *hydroids* on floating seaweed and *Ceratium*. Unfortunately I had no good opportunity on board the vessel to preserve the fine *coelenterats*. Thus most of them are now much contracted and, of course, without their beautiful colors, which interfere with a sure determination. Nor had I time to describe or picture them alive.

Although the collection secured through these few dredgings and surface-gatherings is not yet worked up, I judge it will be interesting to note the following list of the animals brought up in the dredge. By

a very rough selection and examination I have been able to make up the following preliminary account of species accurately distinguished. To this list there will be added many more when all the classes and the pelagic forms are worked up by specialists. Thus I have obtained from the dredging material :

<i>Pisces</i> ,	10	species (at least)
<i>Crustacea</i> : <i>Decapoda</i> ,	10	" "
<i>Schizopoda</i> ,	2	" "
<i>Cumacea</i> ,	2	" "
<i>Isopoda</i> ,	5	" "
<i>Amphipoda</i> ,	20	" "
<i>Pycnogonida</i> ,	2	" "
<i>Mollusca</i> : <i>Cephalopoda</i> ,	1	" "
<i>Gastropoda</i> ,	15	" "
<i>Lamellibranchiata</i> ,	11	" "
<i>Tunicata</i> ,	6	" "
<i>Brachiopoda</i> ,	1	" "
<i>Vermes</i> ,	15	" "
<i>Echinodermata</i> : <i>Crinoidea</i> ,	2	" "
<i>Asteroidea</i> ,	4	" "
<i>Ophiuroidea</i> ,	10	" "
<i>Echinoidea</i> ,	1	" "

Total, 115 species (at least)

Polyzoa, *hydrozoa* and *spongiæ* are to be added to this list, besides all animals obtained with the surface-net and in some fresh-water pools at Godhavn, which I found to contain great numbers of *Branchiopus*, *Apus*, *copepods*, *ostracods* and other organisms not yet examined.

If the number of species already classified (which will be considerably increased after a more careful and detailed examination of the whole material), is compared with a list of the collection brought home by the Nares' Expedition of 1875-1876, the result will be somewhat surprising when we find that our material, obtained in a few dredgings and almost exclusively at one station, viz., in Inglefield Gulf, will, probably, exceed that collection in number both of species and individuals. It is true that the Nares' collection was obtained farther north from lat. 78° to 83° N., within an area where one might possibly expect the fauna to be poorer on account of the geographical position in higher latitude. Nevertheless, considering the great number of dredgings and the extensive circuit within which they were carried on, the difference in regard to number of species and individuals secured during both expeditions is a remarkable one. It would be

interesting, therefore, for future naturalists visiting these regions to determine whether the fauna is actually so much poorer at localities situated at 2-3 degrees farther north. For the sake of comparison it will be of interest to examine Nares' list : ⁴

<i>Pisces</i> ,	10 species (including 3 fresh-water forms)
<i>Crustacea</i> : <i>Decapoda</i> ,	9 " (1 with ?)
<i>Schizopoda</i> ,	1 "
<i>Isopoda</i> ,	5 "
<i>Amphipoda</i> ,	12 "
<i>Pycnogonida</i> ,	2 (3) species
<i>Mollusca</i> : <i>Gastropoda</i> ,	19 " (1 with ?)
<i>Lamellibranchiata</i> ,	16 " (2 " ?)
<i>Brachiopoda</i> ,	1 "
<i>Vermes</i> ,	23 "
<i>Echinodermata</i> : <i>Crinoidea</i> ,	2 "
<i>Asteroidea</i> ,	8 "
<i>Ophiuroidea</i> ,	8 (7) "
<i>Echinoidea</i> ,	1 "
<i>Holothurioidea</i> ,	1 "

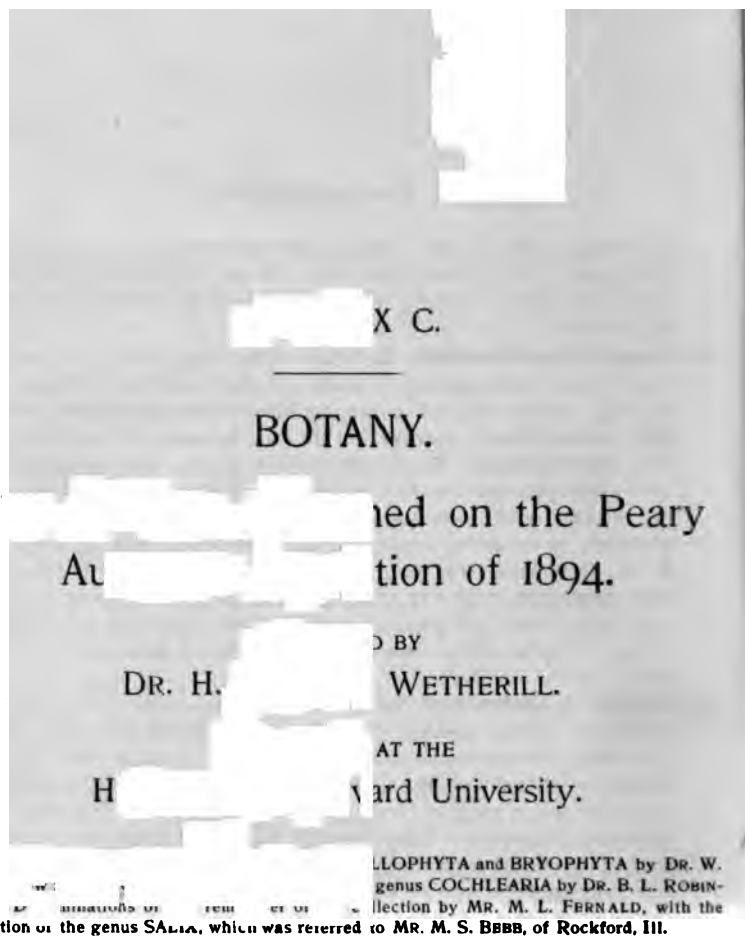
Total, 118 (110) species

Other classes are also enumerated in the Nares' list, but not having as yet the material of the corresponding groups separated, I cannot give here, even provisionally, a parallel series. No doubt the material brought home by the Nares' Expedition was the most complete collection of marine fauna from Baffin Bay and Smith Sound, or, perhaps, the only one. Since that time Greely's Expedition is the only one that visited those regions before Peary ; Greely's expedition and the first of the Peary expeditions did not bring home any collections of marine fauna, as no dredgings were carried on. I have thought it proper to publish this preliminary report to show how rich is the animal life in those waters, and to draw attention to the fact that so little is known of the fauna, and to indicate what a fertile field for further zoölogical explorations is presented by these seas which have hitherto been sounded so few times.

The material will be worked up by specialists as soon as possible, and I hope then to be able to publish a full account of all forms obtained during the expedition.

Lund, Sweden, December 10, 1894.

* I. c. Vol. 2, Appendix.



Ranunculus pygmaeus, Wahl. Cape Faraday, Ellesmere Land (No. 152).

Ranunculus nivalls, L. On cliffs, northwest side of Disco Island (No. 78); north side of Jones Sound (No. 162); Northumberland Island (No. 187).

Papaver nudicaule, L., var. **arcticum**, Elkan. Abundant, Godthaab (No. 15); Cape York (No. 73); on cliffs, northwest side of Disco Island (No. 84); near Cape Acland, Inglefield Gulf (No. 130); Fan Glacier, Inglefield Gulf (No. 145); Cape Faraday (No. 156); north side of Jones Sound (No. 163). A white-flowered form comes from Bowdoin Bay, Inglefield Gulf (No. 44), and from the Glacier Valley north of the promontory to the west of Robertson's Bay (No. 108). It is said that the pistils are eaten, probably for the opium which they may contain.

Lesquerella arctica, Watson. Fan Glacier, Inglefield Gulf (No. 196).

The species of the arctic genus **Cochlearia** are in a state of considerable confusion, which renders the exact identification of specimens at present almost impossible. The difficulties presented arise on the one hand from the inherent variability of the species and the obscurity of their characteristics, especially as shown in dried specimens; on the other, in the uncertainty which prevails still among European botanists as to the

exact application of the Linnaean descriptions relating to members of the genus. The present collections contain specimens of *Oochlearia* collected in two localities, and to be referred doubtfully to the following species :

- Oochlearia Grœnlandica*, L.** The spreading stems 3-4 inches in length ; the central one much shorter : radical and lowest cauline leaves on long, slender petioles, ovate, cordate, entire, marcescent ; the middle cauline oblong, narrowed at the base to more or less distinct petioles, entire or nearly so ; the uppermost sessile, often inconspicuously auriculate : flowers crowded at the ends of the stems, relatively large : the obovate, white petals nearly two lines in length : fruit, when young, globose ; at maturity, ovoid ; valves scarcely reticulated.—Cape York, N. W. Greenland (No. 189). This plant appears to be a form of *O. Grœnlandica*, near var. *oblongifolia*, Lange (Conspect. Fl. Grœnl. 35). The stems and petioles, and to some extent the leaves, possess a noteworthy viscosity, shown by the clinging of grains of sand, seeds, etc.
- Oochlearia fenestrata*, R. Br.** Dwarf ; central stem short, erect ; the lateral an inch or two long, spreading : leaves small, the radical as in the preceding, the cauline narrowly oblong, entire, contracted at the base : flowers smaller than in the preceding : capsule ellipsoidal or even somewhat pointed at apex and base, more or less distinctly reticulated ; septum often fenestrate.—Cape Faraday, Ellesmere Land (No. 199).
- Although these forms from their fruiting characters are apparently to be referred as above, it may be noted that the relative size of the flowers is just opposite that indicated by Professor Lange in the place cited.
- Draba alpina*, L.** Glacier Valley, north of promontory to the west of Robertson's Bay (No. 191) ; near Cape Acland, Inglefield Gulf (No. 192) ; Fan Glacier, Inglefield Gulf (No. 195) ; north side of Jones Sound (Nos. 200, 202).
- Draba Fladnizensis*, Wulf.** Fan Glacier, Inglefield Gulf (Nos. 197, 198) ; near Cape Acland, Inglefield Gulf (No. 201) ; Glacier Valley, north of promontory to the west of Robertson's Bay (No. 204) ; north side of Jones Sound (No. 227).
- Draba incana*, L.** Godthaab (No. 16) ; Netiulume, Whale Sound (No. 203).
- Arabis alpina*, L.** Cliff, northwest side of Disco Island (No. 77).
- Raphanus Raphanistrum*, L.** Disco (No. 13). Apparently this is the first time this common European weed has been collected in Greenland.
- Silene acaulis*, L.** Abundant, Godthaab (No. 34) ; Cape York (No. 71) ; on cliffs, northwest side of Disco Island (No. 83) ; Glacier Valley, north of promontory to the west of Robertson's Bay (No. 107) ; near Cape Acland, Inglefield Gulf (No. 129) ; Fan Glacier, Inglefield Gulf (No. 147).
- Lychnis apetala*, L.** Near Cape Acland, Inglefield Gulf (No. 131) ; Fan Glacier, Inglefield Gulf (No. 134) ; north side of Jones Sound (No. 159).

- Lychnis triflora*, R. Br. Godthaab (No. 35); Bowdoin Bay, Inglefield Gulf (No. 45); Netiulume, Whale Sound (Nos. 180, 183).
- Arenaria verna*, L. Fan Glacier, Inglefield Gulf (No. 193).
- Arenaria ciliata*, L., var. (?) *humifusa*, Hornem. Fan Glacier, Inglefield Gulf (No. 194).
- Arenaria peplodes*, L. Cape York (No. 72).
- Stellaria media*, Cyrillo. Disco (No. 14).
- Stellaria humifusa*, Rottb. On cliffs, Dalrymple Island (No. 47).
- Stellaria longipes*, Goldie, var. *Edwardsii*, Watson. Godthaab (No. 33); Netiulume, Whale Sound (No. 172); Northumberland Island (No. 186). No. 133 from Fan Glacier, Inglefield Gulf, is sterile, but probably goes here.
- Cerastium alpinum*, L. Godthaab (No. 46); Cape York (No. 74); cliffs, northwest side of Disco Island (No. 76); Southeast Cary Island (No. 98); Glacier Valley, north of promontory to the west of Robertson's Bay (No. 102); near Cape Acland, Inglefield Gulf (No. 132); Fan Glacier, Inglefield Gulf (No. 135); Cape Faraday (Nos. 150, 151); Clarence Head, North Lincoln (No. 157); north side of Jones Sound (No. 158); Netiulume, Whale Sound (No. 181). An extremely variable species.
- Montia fontana*, L. Near Cape Acland, Inglefield Gulf (No. 125).
- Dryas octopetala*, L., var. *integrifolia*, C. & S. Abundant, Godthaab (No. 17); Cape York (No. 69); cliff, northwest side of Disco Island (No. 81); Glacier Valley, north of promontory to the west of Robertson's Bay (No. 109); near Cape Acland, Inglefield Gulf (No. 128); Fan Glacier, Inglefield Gulf (No. 149); north side of Jones Sound (No. 166).
- Potentilla emarginata*, Pursh. Fan Glacier, Inglefield Gulf (No. 144); north side of Jones Sound (No. 160).
- Potentilla nivea*, L. Godthaab (No. 18); Netiulume, Whale Sound (No. 174). A form equaling *P. Vahliaana*, Lehm., from Cape York (No. 70); cliffs, northwest side of Disco Island (No. 82); Southeast Cary Island (No. 100).
- Potentilla frigida*, Vill.? No. 43 from Bowdoin Bay, Inglefield Gulf, has been referred here, though it may be a very depauperate form of *emarginata*, Pursh.
- Sibbaldia procumbens*, L. Disco (No. 12).
- Saxifraga nivalis*, L. North side of Jones Sound (No. 161).
- Saxifraga cernua*, L. Near Cape Acland, Inglefield Gulf (No. 124); Cape Faraday (No. 155); north side of Jones Sound (No. 164); Northumberland Island (No. 184).
- Saxifraga caespitosa*, L. Cape York (No. 67); on cliffs, northwest side of Disco Island (No. 79).
- Saxifraga tricuspidata*, Retz. Godthaab (No. 24); Bowdoin Bay, Inglefield Gulf (No. 40); Cape York (No. 66); Northumberland Island (No. 185).
- Saxifraga oppositifolia*, L. Abundant, Cape York (No. 68); cliffs, northwest side of Disco Island (No. 80); Southeast Cary Island (No.

- 99); Glacier Valley, north of promontory to the west of Robertson's Bay (No. 110); near Cape Acland, Inglefield Gulf (No. 126); Fan Glacier, Inglefield Gulf (No. 148); Cape Faraday (No. 154); north side of Jones Sound (No. 165).
- Epilobium angustifolium**, L. Collected at Disco (No. 1) early in September with immature buds.
- Epilobium latifolium**, L. Godthaab (No. 25); near Cape Acland, Inglefield Gulf (No. 127); Fan Glacier, Inglefield Gulf (No. 146).
- Antennaria alpina**, Gärtn. Godthaab (No. 20).
- Arnica alpina**, Olin. On cliffs, northwest side of Disco Island (No. 85); Fan Glacier, Inglefield Gulf (No. 141).
- Taraxacum officinale**, Weber. Disco (No. 11), one of the specimens approaching var. *lividum*, Koch.
- Taraxacum officinale**, var. *lividum*, Koch. Netiulume, Whale Sound (No. 175).
- Vaccinium uliginosum**, L., var. *muconatum*, Herder. Abundant, Godthaab (No. 23); Cape York (No. 61); cliffs, northwest side of Disco Island (No. 89); near Cape Acland, Inglefield Gulf (No. 121); Fan Glacier, Inglefield Gulf (No. 142). One branch of No. 121 has leaves fully as large as in the type.
- Ossiope tetragona**, Don. Godthaab (No. 21); Bowdoin Bay, Inglefield Gulf (No. 41); Cape York (No. 62); cliffs, northwest side of Disco Island (No. 87); Glacier Valley, north of promontory to the west of Robertson's Bay (No. 106); near Cape Acland, Inglefield Gulf (No. 123); north side of Jones Sound (No. 168).
- Bryanthus taxifolius**, Gray. Cliffs, northwest side of Disco Island (No. 90).
- Rhododendron Lapponicum**, Wahl. Cape York (No. 64); cliffs, northwest side of Disco Island (No. 88).
- Pyrola rotundifolia**, L., var. *pumila*, Hook. Abundant, Disco (No. 10); Godthaab (No. 22); Bowdoin Bay, Inglefield Gulf (No. 42); Cape York (No. 63); cliffs, northwest side of Disco Island (No. 86).
- Diapensia Lapponica**, L. Godthaab (No. 127); Cape York (No. 60).
- Armeria vulgaris**, Willd. Not very abundant, Cape York (No. 65); near Cape Acland, Inglefield Gulf (No. 122); Fan Glacier, Inglefield Gulf (No. 143); Netiulume, Whale Sound (No. 176).
- Mertensia maritima**, Don. Not very abundant, Cape York (No. 59).
- Bartsia alpina**, L. Cape York (No. 55).
- Pedioularis flammea**, L. Quite abundant in low ground at Cape York (No. 58).
- Pedioularis hirsuta**, L. Cape York (No. 56); cliffs, northwest side of Disco Island (No. 92); north side of Jones Sound (No. 167).
- Pedioularis Langsdorffii**, Fisch., var. *lanata*, Gray. Cape York (No. 57); on route to ice-cap, Blaesø Dael and Red River (No. 75); cliffs, northwest side of Disco Island (No. 91).
- Pedioularis Lapponica**, L. Cliffs, northwest side of Disco Island (No. 93).

- Polygonum viviparum**, L. Disco (No. 9); Godthaab (No. 26); cliffs, northwest side of Disco Island (No. 95); near Cape Acland, Inglefield Gulf (No. 120).
- Oxyria digyna**, Hill. Godthaab (No. 19); cliffs, northwest side of Disco Island (No. 94); Glacier Valley, north of promontory to the west of Robertson's Bay (No. 105); near Cape Acland, Inglefield Gulf (No. 119); Fan Glacier, Inglefield Gulf (No. 140); north side of Jones Sound (No. 169); Netiulume, Whale Sound (No. 177); Northumberland Island (No. 188).
- Betula nana**, L. Disco (No. 8); Cape York (No. 54).
- Salix Brownii**, Bebb. (*S. arctica*, R. Br. non Pal.). Disco (No. 206); Godthaab (No. 207); Bowdoin Bay, Inglefield Gulf (No. 208); Cape York (No. 212); Southeast Cary Island (No. 216); Glacier Valley, north of promontory to the west of Robertson's Bay (No. 217); Fan Glacier, Inglefield Gulf (No. 220); north side of Jones Sound (Nos. 223, 224, 225). Variations from the type are shown in No. 205 from Disco, No. 221 from Fan Glacier, Inglefield Gulf, and in No. 226 from Netiulume, Whale Sound. No. 219, from Cape Acland, Mr. Bebb considers near the next species.
- Salix glauca**, L. Cape York (Nos. 209, 210, 211, 213); Fan Glacier, Inglefield Gulf (No. 222). No. 215 from the northwest side of Disco Island is intermediate between this and the last species.
- Empetrum nigrum**, L. Disco (No. 7); Godthaab (No. 39); Cape York (No. 53).
- Tofieldia palustris**, Huds. Near Cape Acland, Inglefield Gulf (No. 118).
- Luzula arcuata**, Meyer. Glacier Valley, north of promontory to the west of Robertson's Bay (No. 103); Fan Glacier, Inglefield Gulf (No. 139); north side of Jones Sound (No. 170).
- Eriophorum Scheuchzeri**, Hoppe. Disco (No. 6); Godthaab (No. 29); near Cape Acland, Inglefield Gulf (No. 117); Fan Glacier, Inglefield Gulf (No. 138).
- Eriophorum polystachyon**, L. Near Cape Acland, Inglefield Gulf (No. 116); Fan Glacier, Inglefield Gulf (No. 137).
- Carex rigida**, Gooden., var. *Goodenovii*, Bailey. Godthaab (No. 28); near Cape Acland, Inglefield Gulf (No. 114); Fan Glacier, Inglefield Gulf (No. 136).
- Carex misandra**, R. Br. Near Cape Acland, Inglefield Gulf (No. 115).
- Carex scirpoidea**, Michx. Cape York (No. 51).
- Carex nardina**, Fries. Glacier Valley, north of promontory to the west of Robertson's Bay (No. 104).
- Alopecurus alpinus**, Sm. On cliffs, Dalrymple Island (No. 48); abundant about the settlement, Cape York (No. 49), where it was called "Blue Grass"; Cape Faraday, Ellesmere Land (No. 153); north side of Jones Sound (No. 171); Netiulume, Whale Sound (No. 178).
- Hierochloë alpina**, R. & S. Disco (No. 5); Godthaab (No. 30); Bowdoin Bay, Inglefield Gulf (No. 38); north side of Jones Sound (No. 172).
- Calamagrostis phragmitoides**, Hartm. Disco (No. 4).

- Deschampsia brevifolia**, R. Br. Near Cape Acland, Inglefield Gulf (No. 111).
- Deschampsia alpina**, R. & S. ? Cliffs, northwest side of Disco Island (No. 96).
- Trisetum subspicatum**, Beauv. Disco (No. 3).
- Phippsia algida**, R. Br. Southeast Cary Island (No. 101).
- Arotagrostis latifolium**, Ledeb. Near Cape Acland, Inglefield Gulf (No. 113).
- Poa abbreviata**, R. Br. Netiulume, Whale Sound (No. 179).
- Poa alpina**, L. North side of Jones Sound (No. 173).
- Poa oenisea**, All. Near Cape Acland, Inglefield Gulf (No. 112).
- Festuca ovina**, L., var. **brevifolia**, Watson. Disco (No. 2).
- Equisetum arvense**, L. Cape York (No. 52).
- Aspidium spinulosum**, Swz., var. **dilatatum**, Hook. Godthaab (No. 32).
- Aspidium fragrans**, Swartz. Bowdoin Bay, Inglefield Gulf (No. 37).
- Oystopteris fragilis**, Bernh. Godthaab (No. 31); Bowdoin Bay, Inglefield Gulf (No. 36); cliffs, northwest side of Disco Island (No. 97).
- Lycopodium Selago**, L. Cape York (No. 50).
- Ceratodon purpureus** (L.) Brid. North side of Jones Sound (227).
- Racomitrium lanuginosum**, Brid. Southeast Cary Island (228); Fan Glacier, Inglefield Gulf (229).
- Aulacomnium turgidum** (Wahlb.) Schwaegr. North side of Jones Sound (230); Fan Glacier, Inglefield Gulf (231).
- Jungermannia minuta**, Crantz. North side of Jones Sound (232).
- Besides the above named **Bryophyta** there were specimens from several localities of members of the genus **Bryum** in a sterile condition, **Polytrichum juniperinum** (Hedw.), Willd., **Hypnum uncinatum**, Hedw., and fragments of other **Hypna**.
- Alectoria ochroleuca** (Ehrh.) Nyl. Cape York (233); cliffs northwest side of Disco Island (234); Glacier Valley (235); northwest side of Jones Sound (236); Northumberland Island (237).
- Dactylina arctica** (Hook.) Nyl. Northumberland Island (238).
- Oetraria nivalis** (L.) Ach. On cliffs, Dalrymple Island (239); Cape York (240); Southeast Cary Island (241); Glacier Valley (242); northwest side of Jones Sound (243); Netiulume, Whale Sound (244).
- Parmelia saxatilis** (L.) Fr. Glacier Valley (245); Fan Glacier, Inglefield Gulf (246).
- Parmelia lanata** (L.) Wallr. Cape York (247).
- Nephroma arcticum** (L.) Fr. Disco (248); Glacier Valley (249).
- Umbilicaria proboscidea** (L.) Stenh., var. **arctica**, Ach. On cliffs, Dalrymple Island (250), where it was the most common species found; Cape York (251); Southeast Cary Island (252); Glacier Valley (253); Fan Glacier (254); Netiulume, Whale Sound (255).
- Umbilicaria anthracina** (Wulf.) Schaer. ?

Two small specimens were collected at Glacier Valley (256), which may be referred to this species with some doubt. The thallus is small, cinereous, with lacerate and fringed margins and fibrillose beneath, especially near the margin. The orbicular apothecia are for the most part simple but are, in some cases, aggregated but not at all plicate. The specimens cannot well be referred to *Gyrophora Wenckii*, J. Müller, nor is the thallus that of the typical *U. anthracina*. In the latter respect it agrees better with *U. cylindrica* (L.) Delis., and it may perhaps be a form of that species in which the apothecia have not become plicate.

Placodium elegans (Lk.) DC. Cape York (257); Southeast Cary Island (258); Glacier Valley (259); Netiulume, Whale Sound (260).

Lecanora rubina, Ach. On cliffs, Dalrymple Island (261).

Rinodina turfacea (Whl.) Nyl. Godthaab (262); Southeast Cary Island (263).

Stereocaulon tomentosum, Fr., var. *alpinum*, Th. Fr. Cape York (264).

Cladonia cornucopioides (L.) Fr. Netiulume, Whale Sound (265).

Buellia geographica (L.) Tuck. Glacier Valley (266).

Sphaerophoron fragile (L.) Pers. Glacier Valley (267).

Desmarestia aculeata (L.) Lamour. Near Cape Acland, Inglefield Gulf (268).

Fucus sp.

Imperfect specimens of a species of *Fucus* were collected near Cape Acland and one specimen also from Cape York, which are interesting from the locality in which they occurred. The specimens are about four inches long, with a prominent midrib, but no air-bladders. Unfortunately the conceptacles are very young, and it is not possible to say whether the species is dioecious or not. The general habit is that of the group of *F. vesiculosus* rather than *F. evanescens* as limited by J. Agardh.

The only fungus collected was a single specimen of a *Lycoperdon*, of which the basal portion only was preserved, and it is only possible to say that the species is probably *L. coelatum*. The locality is Cape York. There were besides some fragments of dead plants, which could not be identified, on which was a fungus which agreed well with *Pyrenophora chrysospora* (Niessl.) Sacc.

The following species were collected only at Godthaab or on Disco Island; i. e., south of latitude 70°:

Arabis alpina, L.

Raphanus Raphanistrum, L.

Stellaria media, Cyrillo.

Sibbaldia procumbens, L.

Epilobium angustifolium, L.

Antennaria alpina, Gærtn.

Bryanthus taxifolius, Gray.

Pedicularis Lapponica, L.

Calamagrostis phragmitoides,
Hartm.

Trisetum subspicatum, Beauv.

Festuca ovina, L., var. *brevifolia*,
Watson.

Aspidium spinulosum, Swartz,
var. *dilatatum*, Hook.

The following species were collected only at Cape York, on the north side of Jones Sound or northward; i. e., north of latitude 75°:

<i>Ranunculus pygmaeus</i> , Wahl.	<i>Pedicularis flammea</i> , L.
<i>Lesquerella arctica</i> , Watson.	<i>Salix glauca</i> , L. (typical form).
<i>Cochlearia Groenlandica</i> , L.	<i>Tofieldia palustris</i> , Huds.
<i>Cochlearia fenestrata</i> , R. Br.	<i>Luzula arcuata</i> , Meyer.
<i>Draba alpina</i> , L.	<i>Eriophorum polystachyon</i> , L.
<i>Draba Fladnizensis</i> , Wulf.	<i>Carex misandra</i> , R. Br.
<i>Lychnis apetala</i> , L.	<i>Carex scirpoidea</i> , Michx.
<i>Arenaria verna</i> , L.	<i>Carex nardina</i> , Fries.
<i>Arenaria ciliata</i> , L., var. (?) <i>humifusa</i> , Hornem.	<i>Alopecurus alpinus</i> , Sm.
<i>Arenaria peploides</i> , L.	<i>Deschampsia brevifolia</i> , R. Br.
<i>Montia fontana</i> , L.	<i>Phippisia algida</i> , R. Br.
<i>Potentilla emarginata</i> , Pursh.	<i>Arctagrostis latifolium</i> , Ledeb.
<i>Saxifraga nivalis</i> , L.	<i>Poa abbreviata</i> , R. Br.
<i>Saxifraga cernua</i> , L.	<i>Poa alpina</i> , L.
<i>Armeria vulgaris</i> , Willd.	<i>Poa cenisea</i> , All.
<i>Merlensia maritima</i> , Don.	<i>Equisetum arvense</i> , L.
<i>Bartsia alpina</i> , L.	<i>Aspidium fragrans</i> , Swartz.
	<i>Lycopodium Selago</i> , L.

The remaining species were collected at various points from Godthaab northward, and appear to be of general distribution.

Isaac C. Russell

GMA
17

THE
Geographical Club

OF PHILADELPHIA



CHARTER, BY-LAWS
LIST OF MEMBERS

JANUARY, 1894

PHILADELPHIA

THE
GEOGRAPHICAL CLUB
OF
PHILADELPHIA



CHARTER, BY-LAWS,
LIST OF MEMBERS

JANUARY, 1894

PRESS OF
EDWARD STERN & CO.
31, 33 AND 35 N. TENTH ST.
PHILADELPHIA.

OFFICERS, 1894.

President.

PROF. ANGELO HEILPRIN.

Vice-Presidents.

MR. EDWARD H. WEIL. DR. E. H. WILLIAMS.

Corresponding Secretary.

MRS. MARY WAGER FISHER.

Recording Secretary.

MR. HENRY G. BRYANT.

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MR. F. LYNWOOD GARRISON

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MRS. S. C. F. HALLOWELL,

MR. COLEMAN SELLERS, JR.,

MR. ALBERT B. WEIMER.

HISTORY.

The inception of the Geographical Club of Philadelphia is found in a call for the organization of such association, bearing date of March 10, 1891.

A preliminary meeting of organization was held in the Academy of Natural Sciences on March 19th. It was then recommended that a Constitution and By-Laws be drafted for presentation at the next meeting.

On the 30th of the same month, in the hall of the Academy of Natural Sciences, on Logan Square, a preliminary meeting for the purpose of framing articles of association was held, and the following gentlemen who had responded to the call were present :

Dr. J. T. Rothrock, Mr. Edward H. Weil, Mr. Simon A. Stern, Mr. Roberts Le Boutillier, Dr. Samuel G. Dixon, Mr. Benjamin Smith Lyman, Dr. Henry Skinner, Prof. Angelo Heilprin and Dr. Benjamin Sharp.

At this meeting Prof. Heilprin was asked to take the chair, and Dr. Sharp acted as Secretary. Provisional articles of association were submitted.

At a meeting held on April 20th, in the hall of the Academy of Natural Sciences, at which the following members were present : Dr. Edward J. Nolan, Mr. Edmund Stirling, Mrs. Sarah C. F. Hallowell, Miss Jean Fraley Hallowell, Mr. and Mrs. Coleman Sellers, Jr., Dr. Henry C. McCook, Dr. D. G. Brinton, Mr. Edward H. Weil, Mr. William Righter Fisher, Dr. Henry Skinner, Mr. Benjamin Smith

Lyman, Dr. Charles L. Mitchell, Prof. Angelo Heilprin, Miss Frances May Bockius, Miss Bessie G. Bockius and Dr. Benjamin Sharp, the articles of association framed at the last meeting were formally adopted.

The following officers were then nominated, and on motion elected :

PRESIDENT.

Prof. Angelo Heilprin.

VICE-PRESIDENTS.

Mr. Edward H. Weil.

Dr. E. H. Williams.

RECORDING SECRETARY.

Dr. Benjamin Sharp.

CORRESPONDING SECRETARY.

Mrs. Wm. Righter Fisher.

TREASURER.

Dr. Samuel G. Dixon.

EXECUTIVE COMMITTEE.

Mrs. Sarah C. F. Hallowell,

Mr. Joseph Wharton,

Mrs. Samuel G. Dixon,

Mr. Coleman Sellers, Jr.,

Mrs. Walter Horstmann,

Mr. Edwin Swift Balch.

On the receipt of a communication from Mr. Wharton, wherein it was stated that it would be impossible for him to serve on the Executive Committee, Dr. Daniel G. Brinton was, on June 1st, elected to fill the vacancy.

The broad purposes of the organization rapidly attracted to it the interest of the community, and before the close of November 104 names had already been enrolled for membership. The first stated meeting of the Club was held in the lecture theatre of the Academy of Natural Sciences, on February 24, 1892, when the President read

an opening address on the "Present Aspects of Geographical Study." Other addresses were delivered by Vice-President Edward H. Weil and by Dr. D. G. Brinton ("On the Relations of Earth to Man"). The stated meetings up to this date have been as follows:

April 6, 1892. Address by Mr. Henry Pettit: "Views of Nature in the Occident and in the Orient."

May 4, 1892. Address by Dr. Charles L. Mitchell: "The Geographical Aspects of Western Norway."

November 2, 1892. Address by President Heilprin: "The Arctic Problem and the Recent Explorations."

December 8, 1892. Address by Mr. E. S. Balch: "Mountain Exploration."

January 4, 1893. Address by Miss Laura Bell: "Characteristics of Constantinople."

February 1, 1893. Address by Mr. W. W. Rockhill: "Through Mongolia and Tibet."

March 1, 1893. Address by Prof. Spencer Trotter: "Animal Migration as Determined by Geographical Configuration."

April 5, 1893. Address by Dr. D. G. Brinton: "Modern Spain and its Culture."

May 4, 1893. Address by Dr. Charles Schaeffer: "The Selkirk Mountains and the High Sierra of California."

November 1, 1893. Address by President Heilprin, "The Past and Future of Geographical Exploration."

December 6, 1893. Addresses and papers by Mr. W. H. Rau ("A Photographer among the Selkirk and Rocky Mountains of Canada"); Miss Harriet J. Baird-Huey ("What to do in Japan"), and Mr. Harold R. Lewis ("Taking Headers in Europe and Japan").

January 3, 1894. Address by Dr. Benjamin Sharp: "Two Months in Hawaii."

At the May meeting of the Club, its incorporation under the laws of the State of Pennsylvania was officially announced, and the Charter, obtained through the kind efforts of Mr. George Gluyas Mercer, was displayed. The Directors of the corporation for the first year appear on the Charter as:

PRESIDENT.

Professor Angelo Heilprin.

VICE-PRESIDENTS.

Mr. Edward H. Weil.

Dr. E. H. Williams.

RECORDING SECRETARY.

Mr. Henry G. Bryant.

CORRESPONDING SECRETARY.

Mrs. Mary Wager Fisher.

TREASURER.

Mr. F. Lynwood Garrison.

BOARD OF DIRECTORS.

Mrs. Sarah C. F. Hallowell,

Dr. Daniel G. Brinton,

Mr. Edwin Swift Balch,

Mr. Coleman Sellers, Jr.,

Mrs. Anna Williams Dreer.

Miss Mary Blakiston,

Mr. Albert B. Weimer.

The names of other incorporators on the Charter are: Mr. George Gluyas Mercer, Miss Frances May Bockius, Miss Martha Bunting, Mr. Gavin W. Hart, Mr. Benjamin Smith Lyman, Mr. Thomas Meehan, Dr. Edward J. Nolan, Civil Engineer Robert E. Peary, Dr. Benjamin Sharp and Dr. Henry Skinner.

As past history of the Club to the present date should be mentioned its association, through a generous contribution of funds, with the Peary Arctic Expedition of 1893, and the issue in April last of the first number of its "Bulletin," containing the address of Mr. Balch on "Mountain Exploration."

CHARTER

OF THE

Geographical Club of Philadelphia.

BE IT KNOWN THAT, The subscribers, having associated themselves for the purpose of organizing the GEOGRAPHICAL CLUB OF PHILADELPHIA, and being desirous of becoming incorporated agreeably to the provisions of an Act of the General Assembly of the Commonwealth of Pennsylvania, entitled "An Act to provide for the incorporation and regulation of certain corporations," approved the twenty-ninth day of April, A.D. 1874, and its supplements, do hereby declare and certify that the following are the purposes, objects, articles and conditions of their said association, for and upon which they desire to be incorporated.

I. The name of the proposed corporation is GEOGRAPHICAL CLUB OF PHILADELPHIA.

II. The purpose for which the corporation is formed is the advancement of the science of geography and of geographical studies and exploration, the recording of discoveries, the presentation of researches, and the accumulation of works on geography.

III. The place where the business of the corporation is to be transacted is the city of Philadelphia, State of Pennsylvania.

IV. The corporation is to exist perpetually.

V. The names and residences of the subscribers are as follows: Ansel Heilprin, 1417 North Sixteenth Street, Philadelphia; Edward H. Weil, 1720 Pine Street, Philadelphia; Edward H. Williams, Rosemont, Pa.; Henry G. Bryant, 2013 Walnut Street, Philadelphia; Mary Wager Fisher, Bryn Mawr, Pa.; F. Lynwood Garrison, Radnor, Pa.; Sarah C. F. Hallowell, 2017 DeLancey Place, Philadelphia; Daniel G. Brinton, 2041 Chestnut Street, Philadelphia; Edwin Swift Balch, 1412 Spruce Street, Philadelphia; Coleman Sellers, Jr., 410 North Thirty-third Street, Philadelphia; Anna Williams Dreer, 101 North Thirty-third Street, Philadelphia; George Gluyas Mercer, 641 North Sixteenth Street, Philadelphia; Frances May Bockius, 1901 North Logan Square, Philadelphia; Martha Bunting, 2000 Arch Street, Philadelphia; Mary Blakiston, 2042 Chestnut Street, Philadelphia; Gavin W. Hart, 1316 Spring Garden Street, Philadelphia; Benjamin Smith Lyman, 708 Locust Street, Philadelphia; Thomas Meehan, Chew Street, Germantown, Philadelphia; Edward J. Nolan, 825 North Twentieth Street, Philadelphia; Robert E. Peary, Washington, D. C.; Ben-

jamin Sharp, 317 North Thirty-fifth Street, Philadelphia; Henry Skinner, 716 North Twentieth Street, Philadelphia; Albert B. Weimer, 1934 Wallace Street, Philadelphia.

VI. The officers of the corporation shall be a President, a First and Second Vice-President, a Recording Secretary, a Corresponding Secretary and a Treasurer, who, together with seven Directors, shall form the Board of Directors, to which shall be entrusted the management of the affairs of the corporation. The names of those chosen Directors for the first year are: Angelo Heilprin, President, 1417 North Sixteenth Street, Philadelphia; Edward H. Weil, First Vice-President, 1720 Pine Street, Philadelphia; Edward H. Williams, Second Vice-President, Rosemont, Pa.; Henry G. Bryant, Recording Secretary, 2013 Walnut Street, Philadelphia; Mary Wager Fisher, Corresponding Secretary, Bryn Mawr, Pa.; F. Lynwood Garrison, Treasurer, Radnor, Pa.; Edwin Swift Balch, 1412 Spruce Street, Philadelphia; Daniel G. Brinton, 2041 Chestnut Street, Philadelphia; Anna Williams Dreer, 101 North Thirty-third Street, Philadelphia; Sarah C. F. Hallowell, 2017 DeLancey Place, Philadelphia; Coleman Sellers, Jr., 410 North Thirty-third Street, Philadelphia; Mary Blakiston, 2042 Chestnut Street, Philadelphia; Albert B. Weimer, 1934 Wallace Street, Philadelphia.

VII. The corporation has no capital stock.

VIII. The yearly income from said corporation, other than that derived from real estate, will not exceed the sum of \$50,000.

WITNESS our hands and seals this tenth day of April, Anno Domini One Thousand Eight Hundred and Ninety-three.

ANGELO HEILPRIN,	[Seal]
EDWARD H. WEIL,	[Seal]
EDWARD H. WILLIAMS,	[Seal]
HENRY G. BRYANT,	[Seal]
ALBERT B. WEIMER,	[Seal]
F. LYNWOOD GARRISON,	[Seal]
GEORGE GLUYAS MERCER,	[Seal]
FRANCES MAY BOCKIUS,	[Seal]
MARTHA BUNTING,	[Seal]
MARY BLAKISTON,	[Seal]
GAVIN W. HART,	[Seal]
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ANNA WILLIAMS DREER,	[Seal]
BENJ. SMITH LYMAN,	[Seal]
THOMAS MEEHAN,	[Seal]
EDW. J. NOLAN,	[Seal]
R. E. PEARY,	[Seal]
BENJ. SHARP,	[Seal]
HENRY SKINNER.	[Seal]

COMMONWEALTH OF PENNSYLVANIA, } ss.
COUNTY OF PHILADELPHIA,

Before me, the subscriber, a Notary Public of the Commonwealth of Pennsylvania, residing in the city of Philadelphia, personally appeared Angelo Heilprin, Gavin W. Hart and George Gluyas Mercer, three of the subscribers to the foregoing certificate of incorporation, and in due form of law acknowledged the same to be their act and deed.

WITNESS my hand and official seal this tenth day of April, Anno Domini One Thousand Eight Hundred and Ninety-Three.

[SEAL]

ALEXANDER DURBIN LAUER,
Notary Public.

DECREE.

And now, this twenty-ninth day of April, A. D. 1893, the within Charter and Certificate of Incorporation, having been presented to me, a Law Judge of said county, accompanied by due proof of publication of the notice of this application as required by the Act of Assembly and rule of Court in such case made and provided, I certify that I have examined and perused the said writing, and have found the same to be in proper form and within the purposes named in the first clause specified in Section Second of the Act of the General Assembly of the Commonwealth of Pennsylvania, entitled "An Act to provide for the Incorporation and Regulation of certain Corporations," approved April 29, A. D. 1874, and the supplements thereto, and the same appearing to be lawful and not injurious to the community, I do hereby, on motion of George Gluyas Mercer, Esquire, on behalf of the petitioners, order and decree that the Charter aforesaid be and the same is hereby approved, and that, upon the recording of the same and of this order, the subscribers thereto and their associates shall be a corporation by the name of GEOGRAPHICAL CLUB OF PHILADELPHIA, for the purposes and upon the terms therein stated.

F. AMEDEE BREGY,
Judge of Court of Common Pleas, No. 1.

COUNTY OF PHILADELPHIA, ss.:

Filed in the Prothonotary's Office of the Court of Common Pleas, in and for said county, this tenth day of April, A.D. 1893.

C. P., No. 1, Mar. Term, 1893, No. 524.

WILLIAM B. MANN,
Prothonotary.

Recorded in the office for the Recording of Deeds, etc., in and for the County of Philadelphia, in Charter Book No. 19, page 302, etc.

WITNESS my hand and seal of office, this tenth day of November, A.D. 1893.

THOMAS GREEN,
Recorder of Deeds.

Geographical Club of Philadelphia.

BY-LAWS.

ARTICLE I.

OBJECTS.

The objects of the Club are :

- (1) The furtherance of the science of geography and the promotion of geographical studies generally.
- (2) The interchange of experiences of travel at home and abroad.
- (3) The recording of discoveries, and the presentation of researches by means of lectures, photographic and other exhibitions.
- (4) The promotion of geographical exploration.
- (5) The accumulation of works on geography and photographs of scenery and people.

ARTICLE II.

MEMBERSHIP.

There shall be three classes of membership : (1) Active, or resident ; (2) Corresponding, or non-resident ; and (3) Honorary.

Active, or resident, members shall pay annual dues as fixed by the Club, and they alone shall have the privilege of voting and of holding office.

Corresponding, or non-resident, members are those who reside beyond the limit of seventy-five miles from the seat of the Club ; they may assume the privileges of active members by the payment of the annual dues.

Only those who have distinguished themselves in the field of geographical knowledge or exploration shall be eligible to honorary membership. Honorary members may be elected by a unanimous vote of the Directors present at any Board Meeting and shall have and enjoy all the privileges of other members except those of voting and of holding office. The number of honorary members shall not exceed twenty-five at any one time.

Nominations for membership shall be made by one member and seconded by two other members in writing to the Board of Directors, who shall have the power to act on such nominations.

The annual dues shall be fixed by the Board of Directors and shall not exceed five dollars, payable on or before the first day of January of each year. Members elected at the May and October meetings shall be assessed one-half the amount of the annual dues. Members elected in November

and December shall not be assessed for dues until the January first following their election. Any member in arrears one year after notification by the Treasurer may be dropped or suspended by the Board of Directors.

Any member or member-elect may become a life member by the payment of fifty dollars, and in such case shall not be liable for further dues, and shall have all the privileges and rights of an active or resident member.

ARTICLE III.

MEETINGS.

The Annual Meeting of the Club, at which the President shall deliver an address on the progress of geographical discovery during the year, shall be held on the evening of the first Wednesday in November.

The other regular meetings of the Club shall be held monthly, on the evenings of the first Wednesday of each month from November to May, inclusive, unless otherwise ordered by the Board of Directors, whose duty it shall be to arrange for the character of such meetings by the preparation of a suitable programme of entertainment; but there shall be no expenditure of money by them on account of the Club beyond the amount contained in the Treasury.

Each member shall be provided with a membership card, and, in addition, with two invitation cards for each meeting, each card admitting but one person. It shall be within the discretion of the Board of Directors to issue additional cards or to withhold, on special occasions, the supplemental cards. No person shall be admitted without a card, unless personally known to the attendant as a member.

Special meetings of the Club may be called by the Board at its discretion, and shall be called upon the written request of four members of the Board addressed to the President. The proceedings of the Board of Directors shall be reported monthly to the Club.

Members of the Board of Directors, who have absented themselves from three consecutive stated meetings of the Board, without the presentation of excuse for such absence, shall be considered to have forfeited their seats, and the places so left vacant shall be filled (by appointment) by the Board of Directors.

ARTICLE IV.

ELECTION OF OFFICERS.

A Nominating Committee, to consist of five members of the Club, shall be appointed by the President, at the March meeting of the Club, which committee shall report to the Club at its regular April meeting.

Nominations for officers and directors shall be submitted by the committee at the regular April meeting of the Club, at which meeting any member shall be entitled to make additional nominations. The annual election shall take place at the regular May meeting. The election shall be by secret ballot, after the Australian method, on tickets furnished by the Board of Directors, containing in alphabetical order the names of all persons nominated for the respective offices, and having a blank space where

the voter may write the name of any one not nominated for whom he may wish to vote. Each member shall mark his ticket with a cross (X) opposite the name of the person he desires to vote for. If a voter marks more names than there are persons to be elected to an office, or if, for any other reason, it is impossible to determine the voter's choice, his ballot shall not be counted for such office.

No person shall be eligible for the office of President or for the office of Vice-President for more than two consecutive terms.

ARTICLE V.

COMMITTEES AND PROFESSORSHIPS.

Standing Committees shall be elected by the Club, but the Chairman of such Committees shall be designated by the Board of Directors.

There shall be Standing Committees on Publications and on Excursions.

The Board of Directors shall have the power to create Honorary Professorships of Political and Historical Geography; Physical and Descriptive Geography; Anthro-Geography; Military and Naval Geography; and Cartographical and Topographical Geography.

ARTICLE VI.

PUBLICATIONS AND MEDAL.

The publications of the Club shall be known as the "Bulletin of the Geographical Club of Philadelphia," and shall contain matter referring only to geographical knowledge, or that which is pertinent to the interests of the Club. It shall be under the direction of a Publication Committee.

A Medal to be known as the Elisha Kent Kane Medal of the Geographical Club of Philadelphia may be awarded annually by the Club, on the recommendation of the Board of Directors, to such person as may be designated by a three-fourths vote of the entire Board of Directors, and approved by the majority of the members present at the meeting, and only for important geographical exploration or research made during the twenty-four months preceding the award. The award shall be made at the May meeting of the Club.

ARTICLE VII.

These By-Laws may be amended by the affirmative vote of two-thirds of the members present at any meeting, provided that notice of the intended amendment, with a copy of the proposed amendment, shall have been given at a previous monthly meeting.

HONORARY MEMBERS.

Astrup, Mr. Eivind,
Christiania, Norway.

Fielde, Miss Adele M.,
18 West 43d st., New York
City.

Melville, Chief Engineer, Geo. W.,
U. S. N., Washington, D. C.

Peary, Civil Engineer, Robert E.,
U. S. N., Washington, D. C.

Peary, Mrs. Robert E.,
2014 12th st., N. W., Wash-
ton, D. C.

Rockhill, Mr. William Woodville
Berkeley Springs, W. Va.

ACTIVE MEMBERS.

Abbot, Dr. Griffith E.,
Bryn Mawr, Pa.
Abbot, Mrs. Griffith E.,
Bryn Mawr, Pa.
Abbott, Mr. Francis R.,
1509 Locust st.
Adams, Mr. Charles H.,
137 South 5th st.
Adams, Dr. J. Howe,
2043 Locust st.
Armstrong, Mr. Theodore,
115 Chestnut st.

Bache, Mr. Richard Meade,
4400 Sansom st.
Baird, Mrs. Matthew,
Bardwold, Merion, Pa.
Balch, Miss Elise Willing,
1412 Spruce st.
Balch, Mrs. Thomas,
1412 Spruce st.
Balch, Mr. Edwin S.,
1412 Spruce st.
Balch, Mr. Thomas Willing,
1412 Spruce st.
Baldwin, Miss Anna,
Bryn Mawr, Pa.
Bancroft, Mr. J. Sellers,
3310 Arch st.
Barker, Miss Mary
4300 Spruce st.
Barlow, Thos. W.,
501 Drexel Building.
Beaux, Miss Cecilia,
4305 Spruce st.
Beck, Mr. James M.,
608 Chestnut st.
Bell, Miss Emily,
1428 Spruce st.
Bell, Miss Laura,
1428 Spruce st.

Biddle, Mr. Wm. F.,
4305 Spruce st.
Bitting, Miss Naomi,
1625 Diamond st.
Blakiston, Miss Anna B.,
2042 Chestnut st.
Blakiston, Miss Mary,
2042 Chestnut st.
Bockius, Miss Bessie,
1901 North Logan sq.
Bockius, Miss Frances May,
1901 North Logan sq.
Bonsall, Mr. Amos,
906 Walnut st.
Brinton, Dr. Daniel G.,
2041 Chestnut st.
Brodhead, Mr. L. W.,
Delaware Water Gap, Pa.
Brodhead, Mrs. L. W.
Delaware Water Gap, Pa.
Bryant, Mr. Henry G.,
2013 Walnut st.
Bryant, Mrs. L. L.,
Ogontz, Pa.
Bunting, Miss Martha,
2000 Arch st.
Burdette, Mr. Robert J.,
Bryn Mawr, Pa.
Burnham, Mr. George, Jr.,
214 North 34th st.
Burnham, Mrs. George, Jr.,
214 North 34th st.

Campbell, Miss Mary A.,
405 School Lane, Gtn.
Carryl, Miss Elizabeth S.,
316 South 10th st.
Chambers, Dr. J. Paul,
53d and Media sts.
Chambers, Miss Sarah D.,
53d and Media sts.

- Chauncey, Mr. Charles,
 251 South 4th st.
 Claghorn, Mr. J. R.,
 222 West Logan sq.
 Clements, Miss G. DeVaux,
 2120 Vine st.
 Coates, Mr. Henry T.,
 129 North 20th st.
 Coates, Mrs. Henry T.,
 129 North 20th st.
 Converse, Mr. John H.,
 Rosemont, Pa.
 Converse, Mrs. John H.,
 Rosemont, Pa.
 Cope, Miss Annette,
 121 South 19th st.
 Cornog, Mr. Henry E.,
 Mt. Airy ave., Mt. Airy.
 Cox, Mr. John Lyman,
 2218 St. James Place.
 Crawford, Miss Mary V.,
 Bryn Mawr, Pa.
 Culin, Mr. Stewart,
 127 South Front st.
 Dallam, Mr. David E.,
 Clapier st. and McKean ave.,
 Germantown.
 Dana, Mr. Chas. E.,
 2013 DeLancey Place.
 Dana, Mrs. Chas. E.,
 2013 DeLancey Place.
 Day, Mr. Frank Miles,
 Penn Mutual Building.
 Davis, Miss Mary,
 1436 Poplar st.
 Denniston, Mr. Arthur C.,
 2211 Locust st.
 Dixon, Mr. Henry P.,
 1330 Chestnut st.
 Dixon, Dr. Samuel G.,
 2015 Chestnut st.
 Dixon, Mrs. Samuel G.,
 2015 Chestnut st.
 Dorey, Mr. William H.,
 235 Race st.
 Dornan, Mr. Robert,
 1505 North 16th st.
 Dornan, Mrs. Robert,
 1505 North 16th st.
 Dreer, Mr. William F.,
 101 North 33d st.
 Dreer, Mrs. William F.,
 101 North 33d st.
 Duhring, Dr. Louis A.,
 1411 Spruce st.
 Dutton, Mr. William D.,
 1415 Walnut st.
 Fischer, Mr. Chas. H.,
 209 North 36th st.
 Fisher, Mr. William Righter,
 701 Drexel Building.
 Fisher, Mrs. William Righter,
 701 Drexel Building.
 Fite, Miss Mary,
 2236 Fitzwater st.
 Fox, Rev. Louis R.,
 1800 DeLancey Place.
 Foulke, Mr. J. Roberts,
 34th and Hamilton sts.
 Foulke, Mrs. J. Roberts,
 34th and Hamilton sts.
 Fraser, Mr. Robert,
 333 South 18th st.
 Garber, Miss Ida,
 Bryn Mawr, Pa.
 Garber, Miss Virginia W.,
 Bryn Mawr, Pa.
 Garrison, Mr. F. Lynwood,
 328 Chestnut st.
 Gibson, Mr. J. Howard,
 2001 Walnut st.
 Gillam, Mr. Manly M.,
 N. W. cor. 13th and Chest-
 nut sts.
 Goodman, Miss Mary S.,
 Newtown, Penna.
 Hacker, Miss Beulah M.,
 908 Clinton st.
 Haines, Mr. Joseph A.,
 409 Chestnut st.
 Haines, Mrs. Joseph A.,
 409 Chestnut st.

- Hallowell, Mrs. Sarah C. F.,
2017 DeLancey Place.
- Hallowell, Miss Jean Fraley,
2017 DeLancey Place.
- Hart, Mr. Gavin W.,
209 South 6th st.
- Hart, Mrs. Gavin W.,
209 South 6th st.
- Haupt, Prof. Lewis M.,
107 North 35th st.
- Head, Miss Harriet,
Price st., Germantown.
- Head, Mrs. Elizabeth,
Price st., Germantown.
- Heilprin, Prof. Angelo,
Academy of Natural Sciences.
- Heston, Mrs.,
Newtown, Bucks Co., Pa.
- Holmes, Miss Mary S.,
1331 North 12th st.
- Holt, Dr. J. F.,
1935 Poplar st.
- Horstmann, Mr. Walter,
238 South 13th st.
- Horstmann, Mrs. Walter,
238 South 13th st.
- Hovey, Mr. John G.,
1713 Summer st.
- Huey, Miss Harriet J. Baird-
1425 North 16th st.
- Hutchinson, Mr. Charles Hare,
1617 Walnut st.
- Ives, Mr. James E.,
Drexel Institute.
- James, Mr. Montgomery,
1720 Vine st.
- Janney, Mr. Nathaniel E.,
608 Chestnut st.
- Janney, Miss Susan M.,
1713 Green st.
- Jones, Mr. Horace C.,
"Hedgeley," Conshohocken,
Pa.
- Jones, Mrs. Horace C.,
"Hedgeley," Conshohocken,
Pa.
- Justice, Mr. John M.,
5016 Penn st., Frankford.
- Keely, Dr. Robert N.,
228 South 9th st.
- Kershaw, Mr. William M.,
Penn st., Germantown.
- Kirkbride, Mrs. Thomas S.,
1406 Spruce st.
- Lea, Miss Nina,
2000 Walnut st.
- LeBoutillier, Mr. Roberts,
Germantown.
- Leiper, Mr. Jas. G.,
1602 Master st.
- Leiper, Mrs. Jas. G.,
1602 Master st.
- Lewis, Mr. Harold R.,
1616 North 16th st.
- Lewis, Mrs. Harold R.,
1616 North 16th st.
- Lewis, Miss Julia L.,
250 South 16th st.
- Lippincott, Miss Susan W.,
Cinnaminson, N. J.
- Longcope, Mr. Thos. M.,
1810 Wallace st.
- Longcope, Mrs. Thos. M.,
1810 Wallace st.
- Longstreth, Mr. Edward,
1805 Spring Garden st.
- Lyman, Mr. Benjamin Smith,
708 Locust st.
- Lyndall, Miss Belle,
2011 Arch st.
- Lyndall, Miss M. Ella,
2011 Arch st.
- McConnell, Mrs. S. D.,
1318 Locust st.
- McKeehan, Mr. Charles W.,
2116 Chestnut st.
- McKeehan, Mrs. Charles W.,
2116 Chestnut st.
- Meehan, Mr. Thomas,
Germantown.
- Meehan, Mr. Wm. F.,
Ledger Building.

- Mercer, Mr. George G.,
 641 North 16th st.
 Mitchell, Dr. Charles L.,
 112 North 34th st.
 Morris, Miss Kate,
 2223 Spring Garden st.
 Morris, Mr. Charles,
 2223 Spring Garden st.
 Morris, Mr. Harrison S.,
 137 North 20th st.
 Morton, Miss Helen K.,
 1421 Chestnut st.
 Mucklé, Mr. M. Richards,
 Ledger Building.
 Mumford, Mrs. Mary E.,
 1401 North 17th st.
 Nicholson, Mr. John L.,
 1530 North 10th st.
 Nolan, Dr. Edward J.,
 Academy of Natural Sciences.
 Oliver, Dr. Charles A.,
 1507 Locust st.
 Paul, Mr. J. Rodman,
 903 Pine st.
 Peart, Miss Caroline,
 1901 North Logan sq.
 Peart, Mrs. John,
 1901 North Logan sq.
 Peirce, Dr. C. Newlin,
 1415 Walnut st.
 Peirce, Mrs. C. Newlin,
 1415 Walnut st.
 Pettit, Mr. Henry,
 119 South 19th st.
 Pettit, Mr. Robert,
 "The Gladstone," Eleventh
 and Pine sts.
 Rau, Mr. William H.,
 1324 Chestnut st.
 Roberts, Mr. Frank C.,
 13 South 21st st.
 Roberts, Mrs. Frank C.,
 13 South 21st st.
 Roberts, Mr. Charles,
 1716 Arch st.
 Roberts, Mrs. Charles,
 1716 Arch st.
 Roberts, Mr. Israel,
 211½ Market st., Camden,
 N. J.
 Rogers, Mr. Harry,
 1822 Spruce st.
 Rogers, Mrs. Harry,
 1822 Spruce st.
 Rogers, Mr. Frank G.,
 2126 Spruce st.
 *Rogers, Mr. William B.,
 1000 Walnut st.
 Rosengarten, Colonel Joseph G.,
 1532 Chestnut st.
 Ross, Dr. J. W.,
 1716 Chestnut st.
 Rothermel, Mr. John G.,
 4429 Sansom st.
 Sartain, Dr. Paul J.,
 212 West Logan sq.
 Sartain, Miss Amy,
 212 West Logan sq.
 Sartain, Miss Emily,
 S. W. cor. Broad and Master
 sts.
 Sayres, Mr. Edward S.,
 1825 Spruce st.
 Schaeffer, Dr. Charles,
 1309 Arch st.
 Schaeffer, Mrs. Charles,
 1309 Arch st.
 Schively, Miss Adeline F.,
 1503 Centennial ave.
 Scott, Mr. John B.,
 1520 Arch st.
 Sellers, Mr. Coleman, Jr.,
 410 North 33d st.
 Sellers, Mrs. Coleman, Jr.,
 410 North 33d st.
 Serrill, Mr. Wm. J.,
 Darby, Pa.
 Shakespeare, Dr. E. O.,
 Rosemont, Pa.
 Shakespeare, Mrs. E. O.,
 Rosemont, Pa.

* Died March, 1893.

- Shanahan, Rev. J. W.,
48th st. and Lancaster ave.
- Shippen, Mr. Edward,
532 Walnut st.
- Skinner, Dr. Henry,
Academy of Natural Sciences
- Skinner, Mrs. Henry,
716 North 20th st.
- Sharp, Dr. Benjamin,
Academy of Natural Sciences
- Sharp, Mrs. Benjamin,
317 North 35th st.
- Shryock, Mr. W. K.,
823 North Broad st. life
member.)
- Smith, Mr. C. F.,
759 North 20th st.
- Smyth, Prof. A. H.,
126 South 22d st.
- Snively, Rev. S. E., M. D.,
63d and Market sts.
- Snively, Mrs. S. E.,
63d and Market sts.
- Sommerville, Dr. J. M.,
1714 Race st.
- Stambach, Mr. S. P.,
Haverford, Pa.
- Stambach, Mrs. S. P.,
Haverford, Pa.
- Stern, Mr. Simon A.,
431 Chestnut st.
- Stiles, Dr. Geo. M.,
Conshohocken, Pa.
- Stiles, Mrs. Geo. M.,
Conshohocken, Pa.
- Stirling, Mr. Edmund,
Ledger Building.
- Stirling, Mrs. Edmund
1846 Van Pelt st.
- Swain, Mr. Joseph W.,
3303 Race st.
- Tower, Jr., Mr. Charlemagne
243 South 18th st.
- Tryon, Miss Adeline S.,
1931 Race st.
- Vaux, Mr. Geo., Jr.,
404 Girard Building.
- Vorse, Mr. Albert White,
1346 Spruce st.
- Walter, Miss Naomi,
109 North 16th st.
- Wardle, Mrs. E. L.,
125 North 10th st.
- Warner, Mr. F. B.,
1324 Chestnut st.
- Weil, Mr. Edward H.,
1720 Pine st.
- Weimer, Mr. Albert B.,
512 Walnut st.
- Welles, Mr. Chas. S.,
Elwyn, Pa.
- Wetherill, Mr. Edward,
Chalkley Hall, Frankford.
- Wharton, Miss Anne,
Branchtown, Pa.
- Wharton, Mr. Joseph,
P. O. Box 1332, Phila.
- Wharton, Mrs. Joseph,
Branchtown, Pa.
- Wharton, Mr. W. Rodman,
910 Clinton st.
- Wigton, Mr. Wm. H.,
Bryn Mawr, Pa.
- Wigton, Mrs. Wm. H.,
Bryn Mawr, Pa.
- Wright, Mrs. John W.,
1932 Spruce st.
- Williams, Miss Anna W.,
634 North 12th st.
- Williams, Dr. Edward H.,
500 North Broad st.
- Williams, Mr. Talcott,
1833 Spruce st.
- Wilson, Mr. Edward H.,
3412 Spring Garden st.
- Wilson, Mrs. Edward H.,
3412 Spring Garden st.
- Wood, Mr. Stuart,
1620 Locust st.
- Wood, Mr. William E.,
1933 Vine st.
- Woodhouse, Colonel Samuel W.,
1306 Pine st.



LOGAN SQUARE,

Philadelphia, *Mar 30* 1895

Prof. Israel C. Russell
University of Michigan

Dear Sir

I have the honor to inform you
that at a meeting of the Board of Directors, held
March 11th 1895

you were elected a non-resident member of
The Geographical Club of Philadelphia.

Respectfully,

Paul J. Hartman
Recording Secretary.

By-LAW IV: The annual dues shall, after the first of January, 1894, be \$5.00, payable on or before the first day of each year. Members elected at the month immediately preceding the summer interim, shall be assessed only \$2.50 for the balance of the year of their election.

NOTE. - Dues are payable to F. L. GARRISON, Treasurer, 328 Chestnut Street.

THE
GEOGRAPHICAL CLUB
OF
PHILADELPHIA



CHARTER, BY-LAWS,
LIST OF MEMBERS

JULY, 1895

PRESS OF
HILLSTEIN & SON,
41 N. TENTH STREET,
PHILADELPHIA.

OFFICERS, 1895-96.

President.

MR. EDWIN SWIFT BALCH.

Vice-Presidents.

PROF. ANGELO HEILPRIN.

DR. DANIEL G. BRINTON.

Corresponding Secretary.

DR. PAUL J. SARTAIN,

212 West Logan sq.

Recording Secretary.

MR. HENRY G. BRYANT.

Treasurer.

MISS MARY BLAKISTON,

2042 Chestnut st.

.

BOARD OF DIRECTORS.

MR. EDWIN SWIFT BALCH,
PROF. ANGELO HEILPRIN,
DR. DANIEL G. BRINTON,
MISS H. J. BAIRD-HUEY,
MR. WILLIAM F. BIDDLE,
MRS. S. C. F. HALLOWELL,

MISS MARY S. HOLMES,
MR. HENRY G. BRYANT,
DR. PAUL J. SARTAIN,
MRS. MATTHEW BAIRD,
MR. CHARLES CHAUNCEY,
DR. HENRY SKINNER,

MISS MARY BLAKISTON.

HISTORY.

The inception of the Geographical Club of Philadelphia is found in a call for the organization of such association, bearing date of March 10, 1891.

A preliminary meeting of organization was held in the Academy of Natural Sciences on March 19th. It was then recommended that a Constitution and By-Laws be drafted for presentation at the next meeting.

On the 30th of the same month, in the hall of the Academy of Natural Sciences, on Logan Square, a preliminary meeting for the purpose of framing articles of association was held, and the following gentlemen who had responded to the call were present :

Dr. J. T. Rothrock, Mr. Edward H. Weil, Mr. Simon A. Stern, Mr. Roberts Le Boutillier, Dr. Samuel G. Dixon, Mr. Benjamin Smith Lyman, Dr. Henry Skinner, Prof. Angelo Heilprin and Dr. Benjamin Sharp.

At this meeting Professor Heilprin was asked to take the chair, and Dr. Sharp acted as Secretary. Provisional articles of association were submitted.

At a meeting held on April 20th, in the hall of the Academy of Natural Sciences, at which the following members were present : Dr. Edward J. Nolan, Mr. Edmund Stirling, Mrs. Sarah C. F. Hallowell, Miss Jean Fraley Hallowell, Mr. and Mrs. Coleman Sellers, Jr., Dr. Henry C. McCook, Dr. D. G. Brinton, Mr. Edward H. Weil, Mr. William Righter Fisher, Dr. Henry Skinner, Mr. Benjamin Smith Lyman, Dr. Charles L. Mitchell, Prof. Angelo Heilprin, Miss Frances May Bockius, Miss Bessie G. Bockius and Dr. Benjamin Sharp, the articles of association framed at the last meeting were formally adopted, and Prof. Angelo Heilprin elected President of the Club.

The broad purposes of the organization rapidly attracted to it the interest of the community, and before the close of November, 1891, 104 names had already been enrolled for membership. The first stated meeting of the Club was held in the new lecture-

- Shanahan, Rev. J. W.,
48th st. and Lancaster ave.
- Shippen, Mr. Edward,
532 Walnut st.
- Skinner, Dr. Henry,
Academy of Natural Sciences
- Skinner, Mrs. Henry,
716 North 20th st.
- Sharp, Dr. Benjamin,
Academy of Natural Sciences
- Sharp, Mrs. Benjamin,
317 North 35th st.
- Shryock, Mr. W. K.,
823 North Broad st. life
member.)
- Smith, Mr. C. F.,
759 North 20th st.
- Smyth, Prof. A. H.,
126 South 22d st.
- Snively, Rev. S. E., M. D.,
63d and Market sts.
- Snively, Mrs. S. E.,
63d and Market sts.
- Sommerville, Dr. J. M.,
1714 Race st.
- Stambach, Mr. S. P.,
Haverford, Pa.
- Stambach, Mrs. S. P.,
Haverford, Pa.
- Stern, Mr. Simon A.,
431 Chestnut st.
- Stiles, Dr. Geo. M.,
Conshohocken, Pa.
- Stiles, Mrs. Geo. M.,
Conshohocken, Pa.
- Stirling, Mr. Edmund,
Ledger Building.
- Stirling, Mrs. Edmund
1846 Van Pelt st.
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- Tower, Jr., Mr. Charlemagne
243 South 18th st.
- Tryon, Miss Adeline S.,
1931 Race st.
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404 Girard Building.
- Vorse, Mr. Albert White,
1346 Spruce st.
- Walter, Miss Naomi,
109 North 16th st.
- Wardle, Mrs. E. L.,
125 North 10th st.
- Warner, Mr. F. B.,
1324 Chestnut st.
- Weil, Mr. Edward H.,
1720 Pine st.
- Weimer, Mr. Albert B.,
512 Walnut st.
- Welles, Mr. Chas. S.,
Elwyn, Pa.
- Wetherill, Mr. Edward,
Chalkley Hall, Frankford.
- Wharton, Miss Anne,
Branchtown, Pa.
- Wharton, Mr. Joseph,
P. O. Box 1332, Phila.
- Wharton, Mrs. Joseph,
Branchtown, Pa.
- Wharton, Mr. W. Rodman,
910 Clinton st.
- Wigton, Mr. Wm. H.,
Bryn Mawr, Pa.
- Wigton, Mrs. Wm. H.,
Bryn Mawr, Pa.
- Wright, Mrs. John W.,
1932 Spruce st.
- Williams, Miss Anna W.,
634 North 12th st.
- Williams, Dr. Edward H.,
500 North Broad st.
- Williams, Mr. Talcott,
1833 Spruce st.
- Wilson, Mr. Edward H.,
3412 Spring Garden st.
- Wilson, Mrs. Edward H.,
3412 Spring Garden st.
- Wood, Mr. Stuart,
1620 Locust st.
- Wood, Mr. William E.,
1933 Vine st.
- Woodhouse, Colonel Samuel W.,
1306 Pine st.



LOGAN SQUARE,

Philadelphia, Mar 30 1895

Prof. Israel C. Russell
University of Michigan

Dear Sir

I have the honor to inform you
that at a meeting of the Board of Directors, held
March 11th 1895

you were elected a non-resident member of
The Geographical Club of Philadelphia.

Respectfully,

Paul Sartain
Recording Secretary.

BY-LAW IV: The annual dues shall, after the first of January, 1894, be \$5.00, payable on or before the first day of each year. Members elected at the month immediately preceding the summer interim, shall be assessed only \$2.50 for the balance of the year of their election.

NOTE. - Dues are payable to F. L. GARRISON, Treasurer, 328 Chestnut Street.

THE
GEOGRAPHICAL CLUB
OF
PHILADELPHIA



CHARTER, BY-LAWS,
LIST OF MEMBERS

JULY, 1895

OFFICERS, 1895-96.

President.

MR. EDWIN SWIFT BALCH.

Vice-Presidents.

PROF. ANGELO HEILPRIN.

DR. DANIEL G. BRINTON.

Corresponding Secretary.

DR. PAUL J. SARTAIN,

212 West Logan sq.

Recording Secretary.

MR. HENRY G. BRYANT.

Treasurer.

MISS MARY BLAKISTON,

2042 Chestnut st.



BOARD OF DIRECTORS.

MR. EDWIN SWIFT BALCH,
PROF. ANGELO HEILPRIN,
DR. DANIEL G. BRINTON,
MISS H. J. BAIRD-HUEY,
MR. WILLIAM F. BIDDLE,
MRS. S. C. F. HALLOWELL,

MISS MARY S. HOLMES,
MR. HENRY G. BRYANT,
DR. PAUL J. SARTAIN,
MRS. MATTHEW BAIRD,
MR. CHARLES CHAUNCEY,
DR. HENRY SKINNER,

MISS MARY BLAKISTON.

HISTORY.

The inception of the Geographical Club of Philadelphia is found in a call for the organization of such association, bearing date of March 10, 1891.

A preliminary meeting of organization was held in the Academy of Natural Sciences on March 19th. It was then recommended that a Constitution and By-Laws be drafted for presentation at the next meeting.

On the 30th of the same month, in the hall of the Academy of Natural Sciences, on Logan Square, a preliminary meeting for the purpose of framing articles of association was held, and the following gentlemen who had responded to the call were present :

Dr. J. T. Rothrock, Mr. Edward H. Weil, Mr. Simon A. Stern, Mr. Roberts Le Boutillier, Dr. Samuel G. Dixon, Mr. Benjamin Smith Lyman, Dr. Henry Skinner, Prof. Angelo Heilprin and Dr. Benjamin Sharp.

At this meeting Professor Heilprin was asked to take the chair, and Dr. Sharp acted as Secretary. Provisional articles of association were submitted.

At a meeting held on April 20th, in the hall of the Academy of Natural Sciences, at which the following members were present: Dr. Edward J. Nolan, Mr. Edmund Stirling, Mrs. Sarah C. F. Hallowell, Miss Jean Fraley Hallowell, Mr. and Mrs. Coleman Sellers, Jr., Dr. Henry C. McCook, Dr. D. G. Brinton, Mr. Edward H. Weil, Mr. William Righter Fisher, Dr. Henry Skinner, Mr. Benjamin Smith Lyman, Dr. Charles J. Mitchell, Prof. Angelo Heilprin, Miss Frances May Proctor, Miss Bessie G. Bockius and Dr. Benjamin Sharp, the articles of association framed at the last meeting were formally adopted, and Prof. Angelo Heilprin elected President of the Club.

The broad purposes of the organization rapidly attracted to it the interest of the community, and before the close of November, 1891, 104 names had already been enrolled for membership. The first stated meeting of the Club was held in the new lecture

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MRS. S. C. F. HALLOWELL,

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Prof. Angelo Heilprin.

VICE-PRESIDENTS.

Mr. Edward H. Weil.

Dr. E. H. Williams.

RECORDING SECRETARY.

Mr. Henry G. Bryant.

CORRESPONDING SECRETARY.

Mrs. Mary Wager Fisher.

TREASURER.

Mr. F. Lynwood Garrison.

BOARD OF DIRECTORS.

Mrs. Sarah C. F. Hallowell,

Dr. Daniel G. Brinton,

Mr. Edwin Swift Balch,

Mr. Coleman Sellers, Jr.,

Mrs. Anna Williams Dreer,

Miss Mary Blakiston,

Mr. Albert B. Weimer.

The names of other incorporators on the Charter are : Mr. George Gluyas Mercer, Miss Frances May Bockius, Miss Martha Bunting, Mr. Gavin W. Hart, Mr. Benjamin Smith Lyman, Mr. Thomas Meehan, Dr. Edward J. Nolan, Civil Engineer Robert E. Peary, Dr. Benjamin Sharp and Dr. Henry Skinner.

As past history of the Club to the present date should be mentioned its association, through a generous contribution of funds, with the Peary Arctic Expedition of 1893, and the Peary Auxiliary Expedition of 1894, and the issue of the following club "Bulletins" :

"Mountain Exploration," by Mr. Edwin Swift Balch ; "A Journey to the Grand Falls of Labrador," by Mr. Henry G. Bryant ; "The Progress of Discovery and the Lands of Promise to the Explorer," by Prof. Angelo Heilprin ; "Some Facts about Alsace-Lorraine," by Mr. Thomas Willing Balch ; "The Peary Auxiliary Expedition of 1894," by Mr. Henry G. Bryant.

rison : "Geographical Distribution of Moose and Caribou in North America."

March 7, 1894. Addresses by Dr. F. A. Cook : "Shall the Antarctic Regions Remain a Blank upon our Charts?"; by Mr. Walter Wellman : "The Proposed Wellman Arctic Expedition of 1894."

April 4, 1894. Addresses by Prof. E. H. Williams, Jr.: "Lake Packer, Pennsylvania; An Episode in the Early Part of the Glacial Period;" by Prof. Angelo Heilprin : "The Gorges and Waterfalls of Northeastern Pennsylvania."

May 2, 1894. Address by Mr. Sidney Dickinson, M. A., F. R. G. S.: "Picturesque New Zealand."

November 7, 1894. Address by Mr. Henry G. Bryant : "Preliminary Report on the Operations of the Peary Auxiliary Expedition of 1894."

December 5, 1894. Annual Address by the President, Prof. Angelo Heilprin : "The Progress of Discovery and the Lands of Promise to the Explorer."

January 2, 1895. Addresses by Mr. Talcott Williams : "The Mountains of North Carolina;" by Mr. Thomas Willing Balch : "Some Facts about Alsace-Lorraine;" by Dr. Henry Skinner : "Summering in the Maine Woods;" by Mr. Henry C. Mercer : "Cave Hunting in Pennsylvania."

February 6, 1895. Address by Dr. Emil Holub : "Experiences and Adventures in a Journey in South Africa."

March 6, 1895. Address by Mr. William E. Wood : "An Evening in Alaska and Norway."

April 3, 1895. Address by Gen. A. W. Greely : "The Oregon Trail, or the Exploration of Captain Bonneville."

May 1, 1895. Address by Mr. Thomas G. Allen, Jr.: "An Ascent of Mount Ararat."

At the meeting held in May, 1892, the Club's incorporation under the laws of the State of Pennsylvania was officially announced, and the Charter was displayed. The Directors of the corporation for the first year appear on the Charter as :

PRESIDENT.

Prof. Angelo Heilprin.

VICE-PRESIDENTS.

Mr. Edward H. Weil.

Dr. E. H. Williams.

RECORDING SECRETARY.

Mr. Henry G. Bryant.

CORRESPONDING SECRETARY.

Mrs. Mary Wager Fisher.

TREASURER.

Mr. F. Lynwood Garrison.

BOARD OF DIRECTORS.

Mrs. Sarah C. F. Hallowell,

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Mrs. Anna Williams Dreer,

Miss Mary Blakiston,

Mr. Albert B. Weimer.

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COMMONWEALTH OF PENNSYLVANIA, } ss.
COUNTY OF PHILADELPHIA.

Before me, the subscriber, a Notary Public of the Commonwealth of Pennsylvania, residing in the city of Philadelphia, personally appeared Angelo Heilprin, Gavin W. Hart and George Gluyas Mercer, three of the subscribers to the foregoing certificate of incorporation, and in due form of law acknowledged the same to be their act and deed.

WITNESS my hand and official seal this tenth day of April, Anno Domini One Thousand Eight Hundred and Ninety-three.

[SEAL.]

ALEXANDER DURBIN LAUER,
Notary Public.

DECREE.

And now, this twenty-ninth day of April, A. D. 1893, the within Charter and Certificate of Incorporation, having been presented to me, a Law Judge of said county, accompanied by due proof of publication of the notice of this application, as required by the Act of Assembly and rule of Court in such case made and provided, I certify that I have examined and perused the said writing, and have found the same to be in proper form and within the purposes named in the first clause specified in Section Second of the Act of the General Assembly of the Commonwealth of Pennsylvania, entitled "An Act to provide for the Incorporation and Regulation of certain Corporations," approved April 29, A. D. 1874, and the supplements thereto, and the same appearing to be lawful and not injurious to the community, I do hereby, on motion of George Gluyas Mercer, Esquire, on behalf of the petitioners, order and decree that the Charter aforesaid be and the same is hereby approved, and that, upon the recording of the same and of this order, the subscribers thereto and their associates shall be a corporation by the name of GEOGRAPHICAL CLUB OF PHILADELPHIA, for the purposes and upon the terms therein stated.

F. AMEDEE BREGY,
Judge of Court of Common Pleas No. 1.

COUNTY OF PHILADELPHIA, ss.:

Filed in the Prothonotary's Office of the Court of Common Pleas, in and for said county, this tenth day of April, A. D. 1893.

C. P. No. 1, Mar. Term, 1893, No. 524.

WILLIAM B. MANN,
Prothonotary.

Recorded in the office for the Recording of Deeds, etc., in and for the County of Philadelphia, in Charter Book No. 19, page 302, etc.

WITNESS my hand and seal of office, this tenth day of November, A. D. 1893.

THOMAS GREEN,
Recorder of Deeds.

Thirty-fifth Street, Philadelphia; Henry Skinner, 716 North Twentieth Street, Philadelphia; Albert B. Weimer, 1934 Wallace Street, Philadelphia.

VI. The officers of the corporation shall be a President, a First and Second Vice-President, a Recording Secretary, a Corresponding Secretary and a Treasurer, who, together with seven Directors, shall form the Board of Directors, to which shall be entrusted the management of the affairs of the corporation. The names of those chosen Directors for the first year are: Angelo Heilprin, President, 1417 North Sixteenth Street, Philadelphia; Edward H. Weil, First Vice-President, 1720 Pine Street, Philadelphia; Edward H. Williams, Second Vice-President, Rosemont, Pa.; Henry G. Bryant, Recording Secretary, 2013 Walnut Street, Philadelphia; Mary Wager Fisher, Corresponding Secretary, Bryn Mawr, Pa.; F. Lynwood Garrison, Treasurer, Radnor, Pa.; Edwin Swift Balch, 1412 Spruce Street, Philadelphia; Daniel G. Brinton, 2041 Chestnut Street, Philadelphia; Anna Williams Dreer, 101 North Thirty-third Street, Philadelphia; Sarah C. F. Hallowell, 2017 DeLancey Place, Philadelphia; Coleman Sellers, Jr., 410 North Thirty-third Street, Philadelphia; Mary Blakiston, 2042 Chestnut Street, Philadelphia; Albert B. Weimer, 1934 Wallace Street, Philadelphia.

VII. The corporation has no capital stock.

VIII. The yearly income from said corporation, other than that derived from real estate, will not exceed the sum of \$50,000.

WITNESS our hands and seals this tenth day of April, Anno Domini One Thousand and Eight Hundred and Ninety-three.

ANGELO HEILPRIN,	[Seal]
EDWARD H. WEIL,	[Seal]
EDWARD H. WILLIAMS,	[Seal]
HENRY G. BRYANT,	[Seal]
ALBERT B. WEIMER,	[Seal]
F. LYNWOOD GARRISON,	[Seal]
GEORGE GLUYAS MERCER,	[Seal]
FRANCES MAY BOCKIUS,	[Seal]
MARTHA BUNTING,	[Seal]
MARY BLAKISTON,	[Seal]
GAVIN W. HART,	[Seal]
SARAH C. F. HALLOWELL,	[Seal]
D. G. BRINTON,	[Seal]
EDWIN SWIFT BALCH,	[Seal]
COLEMAN SELLERS, JR.,	[Seal]
MARY WAGER FISHER,	[Seal]
ANNA WILLIAMS DREER,	[Seal]
BENJ. SMITH LYMAN,	[Seal]
THOMAS MEEHAN,	[Seal]
EDW. J. NOLAN,	[Seal]
R. E. PEARY,	[Seal]
BENJ. SHARP,	[Seal]
HENRY SKINNER.	[Seal]

knowledge of the nominee, whose qualifications for membership and sympathy with the objects of the Club, as enumerated under Article I, must be stated in writing to the Board of Directors, who shall have the power to act on such nominations.

Corresponding and Honorary members may be elected by the unanimous vote of the Directors present at any Board meeting.

The annual dues shall be fixed by the Board of Directors, and shall not exceed \$5, payable on or before the first day of January in each year. Members elected at the May and October meetings shall be assessed one-half the amount of the annual dues. Members elected in November and December shall not be assessed for dues until the January first following their election. Members whose dues are unpaid on April 1st shall be notified by the Treasurer, and any member in arrears six months after such notification may be suspended or dropped by the Board of Directors.

Any member or member-elect may become a Life member by the payment of fifty dollars, and in such case shall not be liable for further dues, and shall have the privileges and rights of an Active member. All payments for Life membership shall be invested to form a fund whose annual income shall be used for such purposes as the Club may hereafter direct.

ARTICLE III.

CLUB MEETINGS.

The Annual Meeting of the Club shall be held on the evening of the first Wednesday in November, at which meeting the President shall deliver an address, on the progress of geographical discovery during the year, either general or special, or relating to special researches made in connection with geographical inquiry.

The other regular meetings of the Club shall be held monthly, on the evenings of the first Wednesday of each month from November to May, inclusive, unless otherwise ordered by the Board of Directors.

Each member shall be provided with a membership card, and the Resident members, in addition, with two invitation cards for each meeting, each card admitting but one person. It shall be within the discretion of the Board of Directors to issue additional cards, or to withhold, on special occasions, the supplemental cards. No person shall be admitted without a card, unless personally known to the attendant as a member.

Special meetings of the Club may be called by the Board at its discretion, and shall be called upon the written request of four members of the Board, addressed to the President. The proceedings of the Board of Directors shall be reported monthly to the Club.

ARTICLE IV.

BOARD MEETINGS.

Meetings of the Board of Directors for general business shall be held in each month from October to May, inclusive, on such day as the Board shall

Geographical Club of Philadelphia.

BY-LAWS.

ARTICLE I.

OBJECTS.

The objects of the Club are :

- (1) The furtherance of the Science of Geography and the promotion of geographical studies generally.
- (2) The interchange of experiences of travel at home and abroad.
- (3) The recording of discoveries, and the presentation of researches by means of lectures, photographic and other exhibitions.
- (4) The promotion of geographical exploration.
- (5) The accumulation of works on geography and photographs of scenery and people.

ARTICLE II.

MEMBERSHIP.

There shall be four classes of membership :

- (1) ACTIVE OR RESIDENT MEMBERS, who shall pay annual dues as fixed by the Board of Directors, and shall alone have the privileges of voting and holding office.
- (2) NON-RESIDENT MEMBERS, who are those living more than seventy-five miles from Philadelphia. They shall pay one-half the annual dues, and shall be entitled to attend the Club meetings and to receive its publications. They may assume the privileges of Active members at any time on payment of full annual dues.
- (3) CORRESPONDING MEMBERS, who may be chosen from the officers of other geographical or scientific societies and from those who have contributed to geographical knowledge or are engaged in geographical exploration, or other correlated scientific work.
- (4) HONORARY MEMBERS. Only those who have distinguished themselves in the field of geographical knowledge or exploration shall be eligible to Honorary membership. The number of Honorary members shall not exceed twenty-five at any one time.

Corresponding and Honorary members shall be exempt from the payment of dues and shall have all the privileges of other members except those of voting and holding office.

Nominations for Active and for Non-resident membership shall be made by one member and seconded by two other members having personal

knowledge of the nominee, whose qualifications for membership and sympathy with the objects of the Club, as enumerated under Article I, must be stated in writing to the Board of Directors, who shall have the power to act on such nominations.

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ARTICLE IV.

BOARD MEETINGS.

Meetings of the Board of Directors for general business shall be held in each month from October to May, inclusive, on such day as the Board shall

from time to time appoint and announce to the Club. Special meetings of the Board may be called by the President at his discretion and shall be called by him at the written request of four members of the Board.

At all meetings of the Board seven members present shall constitute a quorum for the transaction of business.

Members of the Board of Directors who have absented themselves from three consecutive stated meetings of the Board, without the presentation of excuse for such absence, shall be considered to have forfeited their seats, and the places so left vacant shall be filled (by appointment) by the Board of Directors.

ARTICLE V.

ELECTION OF OFFICERS.

A Nominating Committee, to consist of five members of the Club, shall be appointed by the President, at the March meeting of the Club, which committee shall report to the Club at its regular April meeting their nomination for Officers, Directors and Standing Committees of the Club; at which meeting also any five members may unite in presenting in writing an additional nomination for any office, provided such nominee has consented to serve, if elected; or may within one week after the April meeting send such nomination to the Recording Secretary by mail.

The annual election shall take place at the regular May meeting. The election shall be by secret ballot, after the Australian method, on tickets furnished by the Board of Directors, containing in alphabetical order the names of all persons nominated for the respective offices, and having a blank space where the voter may write the name of any one not nominated for whom he may wish to vote. Each member shall mark his ticket with a cross (X) opposite the name of the person he desires to vote for. If a voter marks more names than there are persons to be elected to an office, or if, for any other reason, it is impossible to determine the voter's choice, his ballot shall not be counted for such office. No person shall be eligible for the office of President or for the office of Vice-President, for more than two consecutive terms. No member shall have the right to vote whose dues are in arrears at the time of the annual election.

ARTICLE VI.

COMMITTEES.

The President shall, at the April meeting of the Club, appoint an Auditing Committee, consisting of two Club members, whose duty it shall be to examine the Treasurer's accounts, determine their correctness and certify the same to the Club at its May meeting.

There shall be Standing Committees of the Club on Excursions and on

Receptions, each consisting of four members elected by the Club and a Chairman appointed from the Board of Directors by the President.

The Standing Committees of the Board of Directors shall be :

- (1) The Executive Committee.
- (2) The Finance Committee.
- (3) The Entertainment Committee.
- (4) The Publication Committee.

The Executive Committee shall consist of the President, the two Vice-Presidents and the two Secretaries, whose duty it shall be to arrange for the stated meetings of the Club, and to prepare suitable programs for presentation at them.

The Finance Committee shall consist of three members, and shall have a general oversight of the receipts, expenditures and investments of the Club, and shall, before the February and May stated meetings of the Board, examine and certify the Treasurer's accounts and vouchers, and report to the Board at the said meetings the result of their examination and the amount of the cash balance in the Treasurer's hands.

The Entertainment Committee shall consist of at least three members, and shall include the ladies who may be members of the Board of Directors.

The Publication Committee shall consist of at least three members.

All necessary appointments to the Standing Committees shall be made by the President at the stated meeting of the Board in May.

Additional Standing Committees may be constituted hereafter by either the Club or the Board of Directors, as may be found expedient by them respectively.

ARTICLE VII.

PUBLICATIONS, PROFESSORSHIPS AND MEDAL.

The publications of the Club shall be known as the **BULLETIN OF THE GEOGRAPHICAL CLUB OF PHILADELPHIA**, and shall contain matter referring only to geographical knowledge, or that which is pertinent to the interests of the Club. It shall be under the direction of the Publication Committee.

The Board of Directors shall have the power to create Honorary Professorships of Political and Historical Geography ; Physical and Descriptive Geography ; Anthro-po-Geography ; Military and Naval Geography ; and Cartographical and Topographical Geography.

A medal, to be known as the Elisha Kent Kane Medal of the Geographical Club of Philadelphia, may be awarded annually by the Club, on the recommendation of the Board of Directors, to such person as may be designated by a three-fourths' vote of the entire Board of Directors, and approved by the majority of the members present at the meeting, and only for important geographical exploration or research made during the twenty-four months preceding the award. The award shall be made at the May meeting of the Club.

ARTICLE VIII.

AMENDMENTS.

These By-Laws may be amended by the affirmative vote of two-thirds of the members present at any meeting, provided that notice of the intended amendment, with a copy of the proposed amendment, shall have been given at a previous monthly meeting.

HONORARY MEMBERS.

Astrup, Mr. Eivind,
Christiania, Norway.
Dawson, Dr. Geo. M.,
Director of the Geological
Survey,
Ottawa, Canada.
Fielde, Miss Adele M.,
18 West 43d Street,
New York City.
Greely, Gen. A. W.,
Chief Signal Officer U. S.
Army,
Washington, D. C.
Holub, Dr. Emil,
Vienna, Austria.

Levasseur, Prof. E.,
Membre de L'Institut,
Paris, France.
Markham, Mr. Clements R., C. B.,
F. R. S., P. R. G. S.,
London, England.
Melville, Geo. W., Engineer in Chief,
U. S. N., Washington, D. C.
Peary, Robert E., Civil Engineer,
U. S. N., Washington, D. C.
Peary, Mrs. Robert E.,
Washington, D. C.
Rockhill, Mr. William Woodville,
Dept. of State,
Washington, D. C.

CORRESPONDING MEMBERS.

Fay, Prof. Charles E.,
Tuft's College, Mass.
Plummer, Mr. Fred G.,
Tacoma, Washington.

Russell, Prof. Israel C.,
University of Michigan,
Ann Arbor, Mich.
Sella, Sig. Vittorio, Biella, Italy.

ACTIVE MEMBERS.

- | | |
|--|---|
| <p>Aaron, Mrs. C. B.,
702 North 43d st.</p> <p>Abbott, Mr. Francis R.,
1509 Locust st.</p> <p>Adams, Dr. J. Howe,
2043 Locust st.</p> <p>Armstrong, Mr. Theodore,
115 Chestnut st.</p> <p>Allen, Mr. Thomas G., Jr.,
Haddonfield, N. J.</p> <p>Bache, Mr. Richard Meade,
4400 Sansom st.</p> <p>Baird, Mrs. Matthew,
Bardwold, Merion, Pa.</p> <p>Balch, Miss Elise Willing (life mem.)
1412 Spruce st.</p> <p>Balch, Mrs. Thomas,
1412 Spruce st.</p> <p>Balch, Mr. Edwin S. (life mem.)
1412 Spruce st.</p> <p>Balch, Mr. Thos. Willing (life mem.)
1412 Spruce st.</p> <p>Baldwin, Miss Anna,
Bryn Mawr, Pa.</p> <p>Bancroft, Mr. J. Sellers,
3310 Arch st.</p> <p>Barker, Miss Mary,
4300 Spruce st.</p> <p>Barlow, Mr. Thos. W.,
501 Drexel Building.</p> <p>Beaux, Miss Cecilia,
4305 Spruce st.</p> <p>Beck, Mr. James M.,
608 Chestnut st.</p> <p>Bell, Miss Emily,
1428 Spruce st.</p> <p>Bell, Miss Laura,
1428 Spruce st.</p> | <p>Belfield, Mr. Alfred,
1814 North 16th st.</p> <p>Biddle, Mr. Wm. F.,
4305 Spruce st.</p> <p>Bissey, Mrs. Herman S.,
1630 North 16th st.</p> <p>Bitting, Miss Naomi,
1625 Diamond st.</p> <p>Blakiston, Miss Anna B.,
2042 Chestnut st.</p> <p>Blakiston, Miss Mary,
2042 Chestnut st.</p> <p>Bockius, Miss Bessie,
1901 North Logan sq.</p> <p>Bockius, Miss Frances May,
1901 North Logan sq.</p> <p>Bonsall, Mr. Amos,
906 Walnut st.</p> <p>Brinton, Dr. Daniel G.,
2041 Chestnut st.</p> <p>Brodhead, Mr. L. W.,
Delaware Water Gap, Pa.</p> <p>Brodhead, Mrs. L. W.,
Delaware Water Gap, Pa.</p> <p>Bryant, Mrs. E. A.,
2013 Walnut st.</p> <p>Bryant, Mr. Henry G.,
2013 Walnut st.</p> <p>Bryant, Mrs. L. L.,
Ogontz, Pa.</p> <p>Bunting, Miss Martha (non res. mem.)
Baltimore, Md.</p> <p>Burdette, Mr. Robert J.,
Bryn Mawr, Pa.</p> <p>Boyer, Mr. Chas. S.,
3223 Clifford st.</p> <p>Campbell, Miss Mary A.,
405 School Lane, Germantown.</p> |
|--|---|

- Chambers, Dr. J. Paul,
 55d and Media sts.
 Chambers, Miss Sarah D.,
 53d and Media sts.
 Chandler, Mr. Alfred N.,
 147 South 4th st.
 Chauncey, Mr. Chas.,
 251 South 4th st.
 Clements, Miss G. De Vaux,
 2120 Vine st.
 Clements, Mr. Alfred,
 1624 Chestnut st.
 Chahoon, Mr. Jos. S.,
 19 South 21st st.
 Chahoon, Mrs. Jos. S.,
 19 South 21st st.
 Cotton, Mrs. Barclay W.,
 747 North 26th st.
 Colket, Mr. C. Howard,
 519 Drexel Building.
 Converse, Mr. John H.,
 Rosemont, Pa.
 Converse, Mrs. John H.,
 Rosemont, Pa.
 Cope, Miss Annette,
 121 South 19th st.
 Cook, Mr. E. S.,
 809 North 24th st.
 Cox, Mr. John Lyman,
 2218 St. James Place.
 Cramp, Mr. Chas. H.,
 507 South Broad st.
 Culin, Mr. Stewart,
 University of Pennsylvania.
 Cushman, Miss Ida,
 1340 Walnut st.

 Dallam, Mr. David E.,
 N. E. cor. 7th and Walnut sts.
 Dana, Mr. Chas. E.,
 2013 DeLancey Place.
 Dana, Mrs. Chas. E.,
 2013 DeLancey Place.
 Day, Mr. Frank Miles,
 925 Chestnut st.
 Denniston, Mr. Arthur C.,
 2211 Locust st.

 Dixon, Mr. Henry P.,
 1330 Chestnut st.
 Dorey, Mr. Wm. H.,
 235 Race st.
 Dornan, Mr. Robt.,
 1505 North 16th st.
 Dornan, Mrs. Robt.,
 1505 North 16th st.
 Douredoure, Mr. Bernard L.,
 2203 Spring Garden st.
 Dunning, Dr. T. S.,
 1328 North 15th st.
 Dreer, Mr. Wm. F.,
 714 Chestnut st.
 Dreer, Mrs. Wm. F.,
 714 Chestnut st.

 Fischer, Mr. Chas. H.,
 209 North 36th st.
 Fisher, Mr. Wm. Righter,
 750 Drexel Building.
 Fisher, Mr. S. Wilson,
 1502 Pine st.
 Fisher, Mrs. S. Wilson,
 1502 Pine st.
 Fite, Miss Mary,
 2236 Fitzwater st.
 Foulke, Mr. J. Roberts,
 3403 Hamilton st.
 Foulke, Mrs. J. Roberts,
 3403 Hamilton st.
 Fraser, Mr. Robt.,
 333 South 18th st.

 Garber, Miss Ida,
 Bryn Mawr, Pa.
 Garber, Miss Virginia W.,
 Bryn Mawr, Pa.
 Garrison, Mr. F. Lynwood,
 Radnor, Pa.
 Gillam, Miss Alice M.,
 666 North 11th st.
 Gillam, Mr. Manly M.,
 N.W.cor. 13th and Chestn't sts.
 Greene, Mr. Frank B.,
 5904 Wayne ave., Germantown.

- Rosengarten, Mr. Jos. G.,
1532 Chestnut st.
- Ross, Dr. J. W.,
1716 Chestnut st.
- Rothermel, Mr. John G.,
4429 Sansom st.
- Sartain, Dr. Paul J.,
212 West Logan sq.
- Sartain, Miss Amy,
212 West Logan sq.
- Sayres, Mr. Edward S.,
1825 Spruce st.
- Schaeffer, Dr. Chas.,
1309 Arch st.
- Schaeffer, Mrs. Chas.,
1309 Arch st.
- Schievely, Miss Adeline F.,
1503 Centennial ave.
- Scott, Mr. John B.,
1520 Arch st.
- Sellers, Mr. Coleman, Jr.,
410 North 33d st.
- Sellers, Mrs. Coleman, Jr.,
410 North 33d st.
- Serrill, Mr. Wm. J.,
Darby, Pa.
- Shakespeare, Dr. E. O.,
Rosemont, Pa.
- Shakespeare, Mrs. E. O.,
Rosemont, Pa.
- Sharp, Dr. Benjamin,
Academy of Natural Sciences.
- Shryock, Mr. Allen (life mem.)
1129 Mount Vernon st.
- Shryock, Mr. W. A. (life mem.)
823 North Broad st.
- Shryock, Mr. W. K. (life mem.)
823 North Broad st.
- Shryock, Mrs. W. K. (life mem.)
S. E. cor. Broad and Parrish sts.
- Shulz, Prof. A. F. von,
Atlanta Baptist Sem. Atl'nta, Ga.
- Shanahan, Rev. J. W.,
48th and Lancaster ave.
- Shippen, Mr. Edward,
532 Walnut st.
- Skinner, Dr. Henry,
Academy of Natural Sciences.
- Skinner, Mrs. Henry,
716 North 20th st.
- Smith, Mr. C. F.,
759 North 20th st.
- Snively, Rev. S. E.,
63d and Market sts.
- Snyder, Mr. John M.,
1400 North 16th st.
- Sommerville, Dr. J. M.,
1714 Race st.
- Stambach, Mr. S. P.,
Haverford, Pa.
- Stambach, Mrs. S. P.,
Haverford, Pa.
- Stiles, Dr. Geo. M.,
Conshohocken, Pa.
- Stiles, Mrs. Geo. M.,
Conshohocken, Pa.
- Stirling, Mr. Edmund,
Ledger Building.
- Stirling, Mrs. Edmund,
1846 Van Pelt st.
- Tenbrook, Mrs. Wm. H.,
1436 Poplar st.
- Thompson, Mr. Samuel S.,
512 North 6th st.
- Tower, Mr. Charlemagne, Jr.,
243 South 18th st.
- Trotter, Dr. Spencer,
Media, Pa.
- Tryon, Miss Adeline S.,
1931 Race st.
- Vaux, Mr. Geo., Jr.,
404 Girard Building.
- Vorse, Mr. Albert White,
The Commonwealth, Boston,
Mass.
- Walter, Miss Naomi,
109 North 16th st.
- Wardle, Mrs. E. L.,
125 North 10th st.
- Warner, Mr. F. B.,
1324 Chestnut st.

- Lippincott, Mrs. J. B.,
 Logan P. O., Philadelphia.
 Lippincott, Miss Susan W.,
 Cinnaminson, N. J.
 Longcope, Mr. Thomas M.,
 1810 Wallace st.
 Longcope, Mrs. Thomas M.,
 1810 Wallace st.
 Longstreth, Mr. Edward,
 1805 Spring Garden st.
 Lyman, Mr. Benj. Smith,
 708 Locust st.
 Lyndall, Miss Belle,
 2011 Arch st.
 Lyndall, Miss M. Ella,
 2011 Arch st.

 Massey, Miss E. E.,
 2018 Vine st.
 Maybin, Miss Elizabeth S.,
 1505 North 15th st.
 Meehan, Mr. Thos.,
 Germantown.
 McConnell, Mrs. S. D.,
 1318 Locust st.
 McLaughlin, Miss Emma V.,
 640 North 32d st.
 Mercer, Mr. Geo. G.,
 738 Drexel Building.
 Morris, Miss Kate,
 2223 Spring Garden st.
 Morris, Mr. Chas.,
 2223 Spring Garden st.
 Morris, Mr. Harrison S.,
 137 North 20th st.
 Morton, Miss Helen K.,
 1421 Chestnut st.
 Mucklé, Mr. M. Richards,
 Ledger Building.
 Mucklé, Mr. John S.,
 210 Drexel Building.
 Myers, Dr. T. D.,
 1703 Locust st.

 Newbold, Mr. Clement B.,
 Philadelphia Club.

 Nichols, Miss Ida C.,
 747 North 26th st.
 Nicholson, Miss Maude L.,
 1530 North 10th st.
 Nicholson Miss Rebecca E.,
 1530 North 10th st.
 Nicholson, Mr. John L.,
 1530 North 10th st.
 Naylor, Mrs. Morris,
 1533 Montgomery ave.
 Nolan, Dr. Edward J.,
 Academy of Natural Sciences.

 Paul, Mr. J. Rodman,
 903 Pine st.
 Peart, Miss Caroline,
 1901 North Logan sq.
 Peart, Mrs. John,
 1901 North Logan sq.
 Pettit, Mr. Henry,
 119 South 19th st.
 Perot, Mrs. Chas. P.,
 142 North 18th st.
 Prichard, Miss Margaret S.,
 5002 Wayne st., Germant'n.

 Rau, Mr. Wm. H.,
 1324 Chestnut st.
 Rawle, Mr. Wm. Brooke,
 230 South 22d st.
 Roberts, Mr. Frank C.,
 13 South 21st st.
 Roberts, Mr. Chas. (life mem.)
 1710 Arch st.
 Roberts, Mrs. Chas.,
 1710 Arch st.
 Roberts, Mr. Israel,
 211½ Market St., Camden, N. J.
 Robinson, Mr. A. W.,
 1926 Race st.
 Rotzell, Dr. W. E.,
 Narberth P. O., Pa.
 Rogers, Mr. Harry,
 424 Chestnut st.
 Rogers, Mrs. Harry,
 424 Chestnut st.
 Rogers, Mr. Frank G.,
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